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LABOR

WAYS OF RAISING INDUSTRIAL LABOR EFFICIENCY STUDIED

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA. EKONOMIKA in Russian No 5, Sep-Oct 82
(manuscript received 4 Apr 81) pp 60-63

[Article by V. I. Brykov: "Unused Potential for Increasing the Labor Efficiency of Workers in Industrial Enterprises"]

[Text] In the present stage of economic development increasing the efficiency of social production is becoming a most important factor of economic growth. This task was also set by the 26th CPSU Congress: "Conditions need to be created in all sectors for highly productive labor, full mechanization and automation have to be speeded up in every way, the work-team form for the organization of work needs to be introduced persistently, quota setting needs to be improved, and the role of the wage as an incentive needs to be strengthened."¹

In the years of the 9th and 10th Five-Year Plans substantial success was achieved in raising production efficiency and improving use of the labor of workers employed in social production. For instance, in industry the rise of labor productivity accounted for 84.0 percent of the growth of output in the 9th Five-Year Plan and 75 percent in the 10th, and labor productivity rose 17 percent. In the 11th Five-Year Plan labor productivity is to rise 23-25 percent in industry.²

Intensification of production based on planned and comprehensive identification and use of technical and organizational reserves for raising labor productivity is becoming the main course in developing the sectors of the economy in the eighties. The task of eliminating manual labor, especially in auxiliary operations, has taken on particular urgency. In 1979 the percentage of manual labor in industry was still substantial. The relative share of mechanized labor is still low in certain types of work: warehouse and packaging work, adjustment of equipment, materials-handling operations, movement of materials and transport, monitoring and measuring, winding, insulting, etc.

In the years of the 9th and 10th Five-Year Plans the technical level of production rose at enterprises of the electrical equipment industry. Whereas at the end of the 8th Five-Year Plan enterprises in the branch had 899 fully mechanized flow lines and 293 semiautomatic and automatic production lines, in the years of the 9th Five-Year Plan their numbers were increased by 1,386 and 359 lines, respectively.³ In the 1981-1985 period plans call for introducing

more than 1,000 mechanized flow lines and more than 300 semiautomatic production lines. The number of automatic process control systems will increase to 60. In the years of the 10th Five-Year Plan the electrical equipment industry boosted its output by 31 percent. In the 11th Five-Year Plan the volume of industrial output will increase 30-35 percent with the same size of the labor force and a constant rise in product quality.⁴

At the present time more than 4,300 samples of products have been awarded the state Quality Emblem through certification. The benefit to the national economy from use of the new products of the electrical equipment industry increased from 403 million rubles in 1970 to 1,501 million rubles in 1980. The principal task of the labor force of the branch in the 11th Five-Year Plan is to further improve product quality and to update products. According to preliminary data, the updating of products and raising the technical level of output in the 11th Five-Year Plan will yield a benefit of 7.5 billion rubles to the economy. In the 1981-1985 period about 10,000 new product designations will be put into production, and at the same time more than 3,000 designations of outdated products will be withdrawn from production.⁵

The level of full mechanization and automation of the labor of workers at enterprises of the electrical equipment industry during the years of the 9th and 10th Five-Year Plans rose steadily, but the rate of its growth was inadequate, especially in auxiliary operations. For instance, at the Sarana "Elektro-vypriyatel'" Plant and the Zaporozhye "Preobrazovatel'" PO [Production Organization] the level of mechanization of labor of workers in the principal production operation is more than 50 percent, in auxiliary operations it is 30 percent; at the Tallinn Electrical Equipment Plant imeni M. I. Kalinin the figures are 75 and 32 percent, respectively, and at the Issyk-Kul'skiy Association of Electrical Equipment Plants 45 and 35 percent, respectively.⁶

The relative share of manual labor among auxiliary workers dropped slightly in the branch as a whole during the years of the 10th Five-Year Plan. The drop at the enterprises indicated was 2-8 percent. An analysis of the occupational composition of industrial workers shows that the most important potential for raising the efficiency of labor, one that can be utilized comparatively quickly, is reduction of the number of manual workers employed in loading and unloading operations.

If all expenditures of labor in auxiliary operations at machinebuilding plants are taken as 100 percent, then transport and warehouse operations will represent about 33 percent, repair and servicing of equipment 26, building repair and maintenance 4, tool manufacturing and use 20, fuel and power service (energobsluzhivaniye) 8, technical inspection 5, and tuneup and adjustment work 4 percent.⁷ Thus labor expenditures for transport and warehouse work, repair work and tool work represent about 80 percent of the total volume of auxiliary operations. At the present time about 12 percent of the total labor force in the branch is employed in transport and warehouse operations, and at certain enterprises this figure goes as high as 18-20 percent. The level of mechanization of labor is more than 40 percent among transport and warehouse workers.

At certain enterprises of the electrical equipment industry constructive experience has been gained in organizing the effort to mechanize loading and unloading operations and transport and warehouse work. For instance, at the Sarana "Elektrovypryamitel'" Plant, thanks to comprehensive introduction of measures concerning the organization of work, mechanization of loading and unloading, transport and warehouse operations, and optimum selection and use of equipment for movement of materials between shops and within the plant as a whole, the level of mechanization of labor of transport and warehouse workers rose 12.0 percent in the 1975-1980 period, while the level of mechanization of work related to external shipments and movement of materials between shops rose 9 and 10 percent, respectively (see the table).

Changes in the Number of Transport and Warehouse Workers and in the Level of Mechanization of Their Labor at the Sarana "Elektrovypryamitel'" Plant Over the 1975-1980 Period*

<u>Indicator</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Relative share of transport and warehouse workers in the total work force, %	8.0	7.4	7.2	7.0	6.8	6.5
Level of mechanization of the labor of transport and warehouse workers, %	52.0	54.0	56.0	59.0	62.0	64.0
Level of mechanization of freight handling, movement of materials and warehouse operations, %	78.0	80.0	82.0	84.5	87.0	87.5
Including:						
Handling external freight, %	80.0	82.0	84.0	87.0	89.0	89.0
Movement of materials between shops, %	76.0	78.0	80.0	82.0	85.0	86.0

* Calculated by the author on the basis of the official statistical reporting of the enterprises.

The task has been set in the 11th Five-Year Plan of guaranteeing the handling and movement of freight, even though the flow of freight is increasing, without increasing the number of transport and warehouse workers, while at the same time substantially increasing the volume of output.

But at certain enterprises in the branch the relative share of workers employed in the movement of materials and freight handling is still high (as high as 30 percent of the total number of auxiliary workers), and the level of mechanization of their labor is still low. In our opinion we should regard the inadequate amount of equipment for full mechanization of production processes, shortcomings in the design of that equipment, its poor use, failure by many enterprises to fulfill the plan for its introduction, and imperfections of the incentive system as the principal reasons for the low level of mechanization of labor.

An important factor in reduction of manual labor is the introduction of scientific management, use of progressive methods of organization of work, etc. Reduction of manual labor makes it possible not only to achieve an additional rise of labor productivity, but also to improve working conditions, to make work more creative, and to increase the qualifications of workers. Every enterprise should have a prospective plan for reduction of manual labor, especially heavy manual labor.

Further improvement of production equipment and technology and the organization of work will have the dominant role in raising labor productivity in the 11th Five-Year Plan.

One of the important directions for raising the labor efficiency of the workers is to apply to production standard plans and charts of the organization of work, especially in auxiliary production. In 1980 about 8 million persons were using the standard plans in industry. They will be introduced in approximately 30,000 sections and more than 4,000 shops, which will make it possible to achieve a relative reduction of the labor force of 2.8 million and to raise labor productivity 6.6 percent. More than 5,000 standard charts of the organization of work will be introduced in the electrical equipment industry.

In order to raise the labor efficiency of workers at enterprises in the branch there is a need to draft and introduce standard plans of the organization of work at work stations and in sections, charts of the organization of work, standard schemes for mechanization of the movement of materials and warehouse operations and other documents whose introduction regulates the work of workers in the principal production operation and auxiliary operations and promotes a rise of labor productivity.

A most important potential for raising labor efficiency is to improve the use of work time. Analysis of work time use of workers in principal production shops and auxiliary shops by compiling descriptions of the workday is practiced to an insufficient extent at industrial enterprises. This situation is not conducive to discovering the causes resulting in losses of work time, but as a rule they are large at a majority of enterprises.

For instance, at the Zaporozhye Transformer Plant the data of workday descriptions⁸ of 178 persons in 16 auxiliary occupations (equipment repair mechanics, mechanics on duty, mechanic-electricians, crane operators, slingmen, toolroom clerks, work schedulers, etc.), the total available time of the workday was distributed as follows (in percentage) according to the workday description:

Performance of work	88.5
Including:	
Preparatory and finishup time	1.2
Operational time	84.5
For attendance of the work station	1.3
Rest breaks and personal needs	1.5

Work time losses	11.5
Including:	
Unproductive work	5.0
Work not covered by the assignment	2.9
Looking for the foreman	1.3
Obtaining and delivery of tools	0.7
Minor repairs by the worker himself	0.1
For organizational and technical reasons	5.0
Including:	
Waiting for work (call)	1.6
Waiting for transport	1.4
Waiting for repairs	1.4
Waiting for workers of other specialties	0.3
Official conversation	0.1
Waiting for supplies	0.1
Waiting for tools	0.1
Longer breaks than those allowed, within the worker's control	1.5

Identification of the causes of work time losses and application to production of measures to improve utilization of work time and the further dissemination of technically sound quotas and standards are among the main directions for raising labor efficiency in the principal production operation and auxiliary operations.

The combining of occupations, improvement of the system of remuneration, improvement of the qualifications of workers, development of collective forms of the organization of work, mastering progressive work methods, and other measures whose effective use is important to industrial enterprises in the 11th Five-Year Plan, must also be envisaged if the labor efficiency of workers at enterprises in the branch is to be raised.

FOOTNOTES

1. "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, 1981, p 108.
2. "Materialy XXV s"yezda KPSS," p 37; "Materialy XXVI s"yezda KPSS," p 108.
3. EKONOMICHESKAYA GAZETA, No 12, 1977.
4. Ibid.
5. EKONOMICHESKAYA GAZETA, No 24, 1981.
6. Calculated by the author on the basis of official statistical reporting of the enterprises.
7. "NOT v mashinostroyenii" [Scientific Management in Machinebuilding], Moscow, 1969, p 198.

8. Calculated from the data of workday descriptions compiled at the PO "Zaporozhtransformator" in 1980.

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LABOR

PRODUCTION BRIGADES UNDER NEW MANAGEMENT

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 12, Dec 82 pp 74-84

[Article by V. Cherevan', candidate of economic sciences, lecturer at Leningrad Higher Party School]

[Text] The advantages and favorable results of the work brigade form of labor organization and pay are indisputable. It has been enriched by all the past experience in economic development, occupies a more and more lasting position in industry, and is inviolably linked with the further improvement of the economic mechanism and widescale involvement of the workers in production management.

An important and crucial stage in intensively introducing work brigades into industry has now been completed. Since 1981, this process has been provided for in the scientific organization of labor annual and five-year plans of enterprises, association, and ministries of industrial branches. According to plans, by the end of the 11th Five-Year Plan, 65 Percent of all industrial workers, and 70-75 percent of workers in machine building will be included in brigade forms of labor. This will save more than 100,000 workers in machine building alone.*

To accomplish this task, the State Committee for Labor and Social Problems (Goskomtrud) has developed procedural documents and model provisions which regulate the conditions and principles of industrial activities, define the functions of brigade soviets and foremen, and establish the bases for labor organization and pay in the brigades. Favorable experience in this sphere of economic activity is thoroughly studied.

Despite branch peculiarities and production specifics, this qualitatively new stage in the development of work brigade forms of labor organization, responsive to the needs of a developed socialist society and the new managerial methods, is defined by a set of general principles. These

*B.N. Gavrilov, "Chemu uchit opyt" [What Experience Teaches] in "Khozraschetnyye brigady v promyshlennosti" [Self-Supporting Brigades in Industry], Moscow, "Pravda," 1982, p 95.

include: brigade level self-support (cost accounting); work on single projects; and evaluation and incentives based on final result, including by coefficient of labor participation (CLP). In contrast to the past periods, attention is now focused on creating composite, integrated brigades, and creatively cooperating brigades.

Integrated (especially self-supporting) brigades are not only the most promising form for planned regulation of the activities of primary labor collectives, but are also the highest form for introducing brigade organization and labor incentives, and are integral to the new economic methods at the present stage. Speaking at the 17th USSR Trade Union Congress, L. I. Brezhnev noted:

Significant economies of time, labor, and material resources are achieved in the integrated brigades, which work on single projects. Discipline is stronger, pay is higher, and young workers master their work more quickly.*

Systematic work on the widescale introduction of the new type brigades is being conducted in Leningrad. The transition to this form of labor organization is being implemented, under the leadership of the oblast and city CPSU committees, based on the composite approach. The slogan of the Leningrad workers--"From each worker's high quality work--to high collective labor efficiency!"--has become its practical basis. The achievements of enterprises in this sphere of economic activity are being taken into account in summing up the results of socialist competition. In order to strengthen party influence in primary labor collectives, work is underway to create party groups in the brigades, and approve party organizers and their soviets. A number of organizational questions have been decided, speeding transition of enterprises to brigade labor methods. The Leningrad and Leningrad Oblast Statistical Administration has established an annual accounting which reflects the overall number of brigades in enterprises, the types of brigades and their number of members, and information about the brigades' use of various systems of pay. Work has developed on making up passports in the brigades and plans for organizational and technical measures in work places. An interindustry center, which generalizes advanced experience in developing the brigade form of labor organization, was created in the council of economic and social development of the CPSU oblast committee. Presently, more than 70,000 brigades, including more than 750,000 workers, have been set up in Leningrad as a result of the implementation of a series of organizational and technical measures in all economic branches.** Brigades have become widespread in machine building and metalworking enterprises, where

* L. I. Brezhnev, "Zabotu o lyudyakh truda, zabotu o proizvodstve--v tsentr vnimaniya profsoyuzov" [Concern for Working People, Concern for Production--At the Center of Attention of Trade Unions]. Speech at the 17th USSR Trade Union Congress, 16 March 1982, Moscow, Politizdat, 1982, pp 6-7.

** "Leningradskaya Pravda," 12 June 1982.

60.5 percent of the workers are already involved in collective forms of labor organization (Table 1). Every second brigade in Leningrad's industrial enterprises is organizing its work on the basis of overall plans for increasing increasing labor efficiency and quality.

Research based on data on Leningrad's industry shows that, in the integrated brigades, planned tasks are being completed with a 10-12 percent reduction in the established brigade strength, a 15-25 percent improvement in the equipment time-sharing factor, and 50 percent fewer non-productive losses of working time than in the city's industry as a whole.*

Table 1

Indices Characterizing the Work Brigade Form of Labor Organization by Individual Sub-Branch of Machine Building in Leningrad in 1982.** (Figures in percentages)

Machine Building Sub-Branch	Workers in Brigades	Share of the Total		Self-Supporting (Cost Accounting) Brigades
		Composite	Specialized	
Machine Building and Metal-Working as a Whole	60.5	27.9	72.1	4.3
Including:				
Heavy, Energy and Transport Machine Building	58.1	30.2	69.8	6.7
Electrical Technology Industry	45.0	16.6	83.4	-
Chemical and Petroleum Machine Building	61.2	41.1	58.9	4.8
Machine Tools and Tools	52.4	31.4	68.6	-
Instrument Making	57.9	21.5	78.5	1.5
Road and Municipal Machine Building	37.9	12.9	87.1	14.5
Machine Building for the Light and Food Industries and Household Appliances	54.1	27.3	72.7	0.1

Just the same, despite the high economic efficiency of the brigade form of labor organization, not all related questions have yet been solved satisfactorily. As the statistics show, only 70 percent of the brigades are working on single projects. Workers' pay is calculated according to the end result of the work in every second brigade. Only 33 percent of the brigade workers are paid based on the coefficient of labor participation (CLP).*** Opportunities to create self-supporting and integrated brigades

* "Pravda," 15 April 1982.

** Calculated according to data of Form No 2-T (Brigade) of the records of industrial enterprises of the Leningrad and Leningrad Oblast Statistics Administration.

*** "Leningradskaya Pravda," 27 March 1982.

--the most effective forms of labor cooperation--are not being fully realized. They comprise 7 and 40 percent respectively of all brigades in all the industry.

Shifting brigades to self--support [cost-accounting] is a complex process. As L. I. Brezhnev noted: "In order to give the self-support brigade the 'green-light' it is necessary to continue to restructure the economic mechanism and improve the procurement of materials and equipment, and to struggle against formalism in planning and in accounting for work performed."* To actively shift to self-supporting brigades requires, first of all, specific indices with which to plan their development. Presently the accomplishments of enterprises, branches, and regions in using collective forms of labor are determined according to that portion of the overall work force which is included in work brigades. This index makes some economic sense, but we must not be limited to it alone. Using this planning method forces enterprise managers to strive to create large numbers of brigades, and neglect the qualitative aspect. This leads to formalism in creation of brigades, and to small and inefficient brigades.

As the data show, presently more than 30 percent of the brigades in the industry have only two or three members. Small brigades not only do not realize the economic and social advantages of collective labor, but do not require improvements to planning, changes to existing management methods, or improvements to the style of work of the various offices and subdivisions of enterprises and associations.

Furthermore, planning according to the index of the proportion of workers in brigades does not permit an objective evaluation of the accomplishments of labor collectives in developing the brigade form of labor organization. Thus, if 80 percent of the workers in the Leningrad Metal Factory are included in work brigades, and 48 percent in Elektroapparat are so involved, one can still not conclude from this that the collective of the first enterprise achieved better results. The fact is that the opportunities and prerequisites for disseminating collective labor methods while preserving normal labor intensity and not damaging production quality stem mostly from the technical level of production and the length of production cycles. They depend directly on the level of division and cooperation of labor in a given enterprise, the enterprises of a branch, or the city as a whole. These opportunities are not the same everywhere. For example, only one in six or seven machine operators in Leningrad enterprises of the metallurgical and agricultural machine building branches works at obsolete metal cutting machines which have served more than 20 years. In enterprises of the electrotechnical and chemical machine building industries, approximately a third of the machines are obsolete. Enterprises also differ sharply in degree of labor mechanization. In the Leningrad Metal Factory and the Nevskiy Factory, approximately 70 percent of labor is mechanized, while in Elektroapparat, the Machine Tool Factory imeni Ya. M. Sverdlov, and the Hoisting and Conveying Equipment Factory imeni S. M. Kirov, it is less than 50 percent. Consequently, not all workers in factories have corresponding equipment and production technology can shift to the brigade form of labor organization.

* "L. I. Brezhnev, op. cit., p 7.

Scientific and technical progress provide the material basis for organizing brigades. Therefore, in studying the tendencies in their development, it is worthwhile to purposefully consider and use the accomplishments of scientific and technical progress and their influence on the organization of labor and production; to provide for strict coordination of collective labor methods, both with the existing technical level of production and with planned organization and technical measures; and to not merely achieve mechanical growth in the number of brigades, but improve their structures.

In the 10th Five-Year Plan, more than 3/4 of all allotted capital investments were aimed at technical re-equipping and reconstruction of Leningrad's enterprises. Special purpose programs (reducing manual and heavy labor; counting; analyzing and eliminating obsolete work places, etc) which provide specific amounts and measures for introduction of the most effective methods of industrial organization, equipment and technology, are contained in the comprehensive plans for economic and social development of many enterprises and regions. The technology specified includes gang, plasma and laser tooling; powder metallurgy; machine tools with numerically programmed control; industrial robots; and means of automation and mechanization. During 1976-1980 alone, 183 plants and factories, and 1485 sections were comprehensively mechanized and automated, and 2070 production, mechanized, and automated lines, and more than 2000 machine tools with numerically programmed control were introduced.*

In many of the city's enterprises, programs for technical re-equipping and reconstruction have been established in keeping with the expanding use of brigade forms of labor organization. The sequence of technological processes for manufacturing and tooling subassemblies and parts, and product specialization are thoroughly considered in developing these plans. This ensures the maximum opportunity to create composite brigades which work on the basis of final results and are of optimum size. Thus, when labor is organized according to the piecework principle, for conditions of small-scale production, the ideal brigade size is projected to be 8-12 persons, while in processes involving mutual ties among workers (mass production), 20-30 person brigades are projected. Effective control is achieved in such brigades. Grouping in this way is especially important now, when fulfillment of brigade plans is equivalent to fulfilling the plans of shops, enterprises, and the association as a whole.

One of the most important trends of technical progress, which is receiving great attention and is opening up broad opportunities for creation of self-supporting, integrated brigades, is the introduction of group production. The CPSU oblast committee has attached special importance to this, and has created a section entitled the Group Production Organization within the Economic and Social Development Council. Formation of group production brigades presupposes that industrial processes will be reorganized on the basis of specialization by production units (sub-assemblies) and parts; creation of self-contained, specialized sections and assembly lines;

* "Narodnoye Khozyaystvo Leningrada in Leningradskoy Oblasti v 10 Pyatiletke" [The Economy of Leningrad and Leningrad Oblast in the 10th Five-Year Plan], Leningrad, Leninizdat, 1981, p 9.

strict sequencing of the technological processes of manufacturing and tooling subassemblies, parts, and assembly line items which takes into account two and three shift equipment utilization and the design and manufacture of highly efficient facilities. The completeness of work in the brigade complex is strictly determined in the item-specialized sections. Consequently, one of the basic conditions of brigade self-support is fulfilled.

The experience of the Leningrad printing plant equipment factory, "Poligrafmash," serves as an example of systematic development of the brigade form of labor organization. Here man-hours on jobs completed by brigade members are over 50 percent of total man-hours. Based on group production, it was possible to bring the number of brigades working on the single project system with elements of brigade self-support [cost accounting] up to 80 percent of the total. All brigades employ the coefficient of labor participation (CLP).

The next important issue on which the effectiveness of the use of self-support at the brigade level to a great extent depends, is the system of planning and evaluation indices. A resolution by the CPSU Central Committee and USSR Council of Ministers, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Raising Industrial Efficiency and Work Quality," is bringing significant changes to the system of indices. The new system has achieved a better combination of real, cost, quantitative and qualitative indices. To a great extent it strengthens the trend of self-supporting teams toward raising work efficiency and quality, rather than quantitative production growth. This is achieved by shifting to planning production volume, labor productivity and wage funds based on normalized net production. Another significant feature of the new indices is that the role of real indices in production planning increases, owing to broadening the approved range of products.

Certainly there is no need to copy all the evaluation indices of the enterprise in the self-supporting brigades. At this level they must be few in number and stem from the specific tasks and nature of production. In developing production tasks it is important to retain the main requirement for planning and evaluation indices--that the evaluation of the results of work be coordinated (integrated) at brigade, shop, and enterprise level.

Presently, many machine building enterprises have considerable experience in the creative approach to formulating planning indices for production brigades' activities. Analysis of their work shows that selection of the correct measure of quantity of product output is of paramount importance in introducing and improving self-supporting brigades. Successful production planning based on final results may be achieved, to begin with, by ensuring strict coordination of the brigade plan for quantity and range of products. Data show that for Leningrad machine building enterprises as a whole, jobs based on product quantity are established in individual and brigade plans for approximately 50-60 percent of all brigades, while only 10-20 percent of brigades have jobs established based on the range of products. As a result,

the brigades, in fulfilling and overfulfilling their target plans according to production quantity, are not giving the shop or enterprise final products expressed in real terms. In the absence of a fixed plan for the range of products, orders for production quantity in the brigades are often changed.

So far a simple solution to the problem of selecting a way of measuring the quantity of products produced by a brigade has not been found in the economic literature or in economic practice. Since in machine building, products are very sharply differentiated and do not always have a cost estimate, the index of production quantity, expressed in normalized hours, has become widespread in planning and evaluating brigades' self-supporting activities. For all its merits, using this method when the industrial activity of enterprises is evaluated by normalized net production makes plan comparability throughout the entire chain (brigade, shop, enterprise) much more difficult. The quantity of a brigade's production, expressed in normalized hours, does not allow sufficient consideration for differences in quality of work, and does not reflect user characteristics of individual products.

The nonequivalence of normalized hours used at various stages of preparing for and planning production is also a shortcoming. As a matter of fact, when documentation is prepared, the description of technological processes and the man-hours required to complete them are fixed according to consolidated norms, while in the brigades these work processes are normalized primarily from specific conditions in the work place using single (individual) norms. Further, when norms fluctuate a lot, the use of normalized hours may retard the introduction of new technology and impede review of production norms, since the latter lowers the production volume expressed in normalized hours. To a large extent, normalized hours encourage labor collectives to increase the volume of simple products, and do not permit a precise reflection of the actual quantity of production completely by the brigades, considering its complexity.

Shortcomings in the normalized hours method of measuring the quantity of production may be eliminated by using normalized rubles in planning. A normalized ruble is characterized by a piece rate for one hour's work. Expressed monetarily, the index of the brigade's plan in normalized rubles corresponds to normalized wages. First of all, this method more precisely reflects the real contribution of a brigade to creating the final product of the enterprise, since, according to the new economic conditions, normalized wages are the basis for calculating the index of normalized net production. Secondly, it eliminates the varied nature of measurement criteria for economic planning and evaluation indices in factory-level cost accounting. Moreover, the normalized ruble index of quantity of production reflects not only quantity, but also the complexity and quality of products completed; it encourages raising workers' qualifications; and it characterizes precisely the dependence of the brigades' wage fund on growth of product output and labor productivity. Higher results in products produced, expressed in normalized rubles, may be achieved by increasing product output in real terms, by qualitative structural advances in product assortment, and by shifting more rapidly to manufacturing new products which require highly

qualified workers. Such improvements are accompanied by increases in wages and in normalized net production. Non-fulfillment of the brigade plan in normalized rubles lowers wages.

The method of tasking the brigades according to quantity of products expressed in normalized rubles is widespread in the Kirov Factory association, and in the Poligrafmash, Elektrik imeni M. M. Shvern timer, and other factories. However, the experience of the Elektrosil imeni S. I. Kirov association is especially valuable. Here, based on a system of methodological and organizational-technical measures, they were able to introduce for the brigades, sections, and shops, a comprehensive factor for developing the production plan in single indices--normalized rubles. The distinctive feature and qualitatively new substance of this effort is that tasking the primary labor collectives is accomplished not by personal (individual workers) but by brigade annual plans.

An annual production plan is established for all brigades working on a piece-work basis, which includes indices of product quantity in constant normalized rubles and in rise in labor productivity. This plan is carefully coordinated with the production tasks in the schedule. The schedule includes products, subassemblies and parts to be manufactured by the brigade during the month. Either a portion of the finished product, or the finished production of the factory (products which have had final assembly and testing), serves as the end result of the brigade's work. The constant normalized rubles for each product or subassembly are determined by aggregating the individual amounts for the component parts. At Elektrosil, annual price lists for each product and part are developed for this purpose. Piece-work prices, effective at the start of each planning year, are adopted for constant normalized rubles. Under conditions of intra-factory cost accounting, brigade production plans are part of the shop production plans, and the latter are a part of the enterprise production plan.

The development of brigade plans for the quantity of products is based on three elements: the brigade's average hourly output in the base year; the brigade's planned increase in labor productivity; and the planned working hours available to the brigade.

Quantitatively, the brigade production plan for quantity of product output (V^{Pb}) in normalized rubles for a given period is determined by the following formula:

$$V^{Pb} = \frac{P^{bch} (100 + A^P)}{100} F_b^P,$$

Where: P^{bch} = average hourly base brigade output in constant normalized rubles

A^P = growth of brigade labor productivity in the plan period

$\% (A^P) = \frac{T^P}{100 - T^P} \cdot 100$, where T^P = percent reduction in man-hours per job in the plan period due to appropriate organizational and technical measures);

F^p_b = working hours available to the brigade during the planning year.

All measures which influence the quantity of production and the increase in labor productivity, and are included in the brigade plan, are shown in Table 2 for a specific brigade of an association.

Table 2

Brigade Plan

for quantity of production and increase in labor productivity by electrical machine mechanics at the Leningrad Production Association Elektrosil imeni S. M. Kirov for 1982.

Foreman -- A. A. Polyakov

INDEX	QUANTITY
Quantity of annual production in constant normalized rubles . .	27,515
Overall increase in labor productivity (in percent)	6.8
Of which (in percent):	
From introduction of organizational and technical measures	4.2
From improving professional skill and use of working time .	1.8
From workers suggested improvements	0.3
From the tasks of workers who had not achieved the brigade's average labor productivity (for increasing hourly output)	0.5
Brigade hourly planned output in constant normalized rubles . .	1-3R
Brigade available working hours	27,310
Reference: Brigade hourly output in constant normalized rubles for previous year	94.6 kopecks

Working out a brigade production plan has its peculiarities and complexities. While it is not difficult to establish base output for a labor organization based on individuals, for the brigade method a number of fundamental questions arise concerning the determination of this index. For example, what should be the common base output figure if brigade members have various ranks and base outputs? With what should the actual brigade output be compared, etc?

At Elektrosil, the base output (P^{bch}) is established by dividing the brigade's annual piece-work wages (calculated as the average amount for all ranks of workers in the brigade) for the year preceding the plan year, by the number of hours actually worked by the brigade, including overtime. Information is collected at the information and computation centers monthly, on each worker and brigade, in order to obtain data on individual piece-work wages and actual time worked.

The bases for establishing the brigade's planned growth in labor productivity are: the program for product output contained in the schedule; organizational and technical measures provide for in the factory and shop plans; and, workers' personal obligations for increasing their professional skills, using working time efficiently, introducing innovations, and undertaking obligations to meet the brigade's average labor productivity.

In 1981, with the shift to the new self-support [cost-accounting] planning and evaluation index in the association, 3.4 percent more workers increased their qualifications than had done so in 1980. Working according to brigade plans permitted a reduction in the number of workers not fulfilling their production plans from 11.2 to 7.6 percent. In all brigades, the rate of growth of labor productivity was almost twice that of wages.

Businesslike cooperation between engineers and brigade workers is attained through engineering and technical workers adopting personal creative plans to participate in developing and introducing organizational and technical measures into the brigades. Twice annually the results of socialist competition are tallied and candidates for the award, "Best Engineering and Technical Worker in the Factory" are made known.

Winners in socialist competition for personal creative plans, and those who provide the greatest economic effect from accomplishing measures in the brigades and the work places, receive a wage increase of up to 30 percent of their pay for one year.

Correct allocation of wages, and strengthening their stimulating role, are integral to developing brigade level self support. The organization of pay and work incentives in a self-supporting brigade must solve at least two tasks: strengthening collective material interest in achieving final results, and encouraging labor collectives to accomplish jobs using the fewest number of workers.

However, the impression must not be formed that the brigade form of labor contains unlimited possibilities for increasing labor productivity. The brigades' internal resources are not unlimited. Therefore, it is necessary to be more flexible and to consider specific conditions when planning their use. No matter how carefully brigades are constituted, some of their achievements in the area of improving labor productivity, including those resulting from reducing the number of workers, are of a one-time nature. Developing the brigade form of labor organization is an uneven process. Research based on industrial enterprises in Leningrad has shown that, whereas in the initial stage the brigades are able to achieve high production results due to efficient labor distribution, assimilation of related professions, consolidation of technical operations, and making norms more strict, later on these reserves are exhausted and the rate of growth of indices stabilizes.

Such slowing of the success of the brigades' activities must not be viewed as ineffectiveness of this form of labor organization. Success is held back

by poor work by the enterprise management apparatuses in introducing into the brigades stable annual and five-year plans, based firmly on norms. Frequent reviews of output norms force the brigades to be more careful in accepting intensive tasks. The additions to wage scales which are employed for combining professions and accomplishing the established amount of work with fewer workers also do not compensate for the additional labor expended. It is one thing when they are paid out to newly created brigades which have significant internal reserves, and another when paid to brigades which have already achieved high labor intensity. In fact, the latter produce and economize more than the former. It is more difficult for them, but the incentives remain the same.

Today, when most brigades have achieved greater labor intensity, effective incentives to uncovering reserves for accelerating brigade labor productivity increases could include: easing restrictions on use of wage fund savings; increasing the amounts of bonuses from these savings up to 60-70 percent of wage scales; differentiating the amount of such bonuses applied to brigades which exceed shop, enterprise, and branch norms, as well as those applied to specialized, composite, and integrated brigades, etc. These would become stages in the growth of self-supporting brigades in the enterprise.

In our view, setting aside a portion of the brigade's wage fund savings to encourage engineering and technical workers who provide suitable organizational and technical conditions, could be an effective means of uniting the interests of the brigades and other teams. Such a form of interrelations would permit current bonuses for managers and design and technological measures in the brigades would serve as the index of the resulting contribution of the engineers.

In order to encourage collective responsibility for final results of labor, it is also important to strengthen the apportioning functions of wages in the brigades, and increase the prestige of the coefficient of labor participation (CLP).

In critically evaluating the experience acquired in apportioning wages in the brigade form of labor organization, it should be said that there are presently many ways of regulating wages: in proportion to time worked; according to wage scale categories and time worked; according to actual work completed; employing the CLP; and calculating conditional categories.

The periods for revising CLP also vary. In some enterprises, revisions occur quarterly, in others monthly, and in still others they are determined based on calculating the average of daily evaluations of brigade members' work. The criteria governing the brigade council in establishing CLP are also unclear. In many instances the factors which determine increasing or reducing CLP duplicate the wage scale system.

The experience of the Leningrad Optical Machine Association imeni V. I. Lenin with respect to this warrants special attention. There an enterprise standard is in effect which established a method of material and moral

incentives for high quality work by brigade workers. Two indices are established for the brigades: fulfilling the norms for production tasks, considering achieved and planned labor productivity, and the coefficient of quality for the brigade's work. The size of the latter is differentiated depending on the brigade's fulfilling the established norm for returned (defective) products, observing technological discipline, innovations, etc. Daily calculation of deviations in the coefficient of labor quality ensures comparability of results and objectivity in determining CLP for each brigade member.

A mathematical model also has been developed in the association, which aids computation of wage apportionment, with CLP calculated on a Minsk-32 electronic computer. To solve this task each brigade is given a series number (code), and computations are made of hourly wage scales, each worker's actual time worked, the difficulty of brigade jobs, labor productivity, brigade wages and extra pay, bonuses, wage fund savings, and so forth. Wages for each worker are calculated based on brigade orders, using the appropriate established way of apportioning collective pay.

The intensity of plan targets is important for evaluating the activity of any collective, since the necessary methodological approaches to solving this problem at the brigade level are lacking. At times this leads to artificially raising wages. Experience shows that many brigades, in fulfilling performance standards by 115-130 percent of the plan, fulfill only 100 percent or slightly more in terms of the quantity of production. As a result, a gap develops between plan indices and brigade self-support (cost accounting) results.

Concerning the system of indices for evaluating the intensity of production plans for associations and enterprises, as a rule indices are employed which characterize productive capacities, labor productivity, product cost prices, etc. At brigade level it is difficult to use such indices. In our view, this function may be fulfilled by normative and actual (plan) indices of equipment time sharing, effective time available, and equipment productivity, with consideration to planned organizational-technical measures. Methodological approaches to determining such norms have been worked out by Leningrad scientists.* Applying the given norms in the brigades, it is possible to establish plan targets for product quantity and labor productivity, and performance standards with sufficient precision; to judge equipment utilization reserves; and to determine the possibilities for and directions of cooperative equipment use among brigades.

Thus the potential for employing the new type brigades is not yet fully realized. Uncovering their potential, and using it in the interests of the further intensification of production are indispensable to establishing progressive forms of labor organization, and successfully solving industrial tasks set by the 26th Party Congress.

*See "Oborudovaniyu-polnyyu zagruzku" [Full Use of Equipment], "Communist," 1980, No 17; and "O metodakh normirovaniya pokazateley ispol'zovaniya osnovnykh fondov" [On Methods of Setting Norms for Use of Primary Funds], "Planovoye Khozyaystvo," 1978, No 2.

LABOR

ALL-UNION REPUBLICS AID RSFSR NONCHERNOZEM AGRICULTURE

Moscow SOTSIALISTICHESKIY TRUD in Russian No 12, Dec 82 pp 88-92

[Article by A. Maykov, first deputy chairman of RSFSR State Committee for Labor: "Fraternal Aid of the Union Republics in Carrying Out the Program for Further Development of the Agriculture of the Nonchernozem Zone of RSFSR"]

[Text] In all stages of development of the Soviet state an important role has been played in solving complicated economic problems, in speeding up the pace of economic and cultural construction, and in expansion of the scale of social development by the close collaboration and mutual fraternal assistance of the peoples of our country. People of different nationalities have worked side by side in building the Turksib [Turkestan--Siberian Railroad], the legendary Dneproges [Dneprovskaya Hydropower Station imeni V. I. Lenin], Komsomolsk-na-Amure, and Magnitka. Hundreds of thousands of volunteers representing all the republics of our great homeland took an active part in developing virgin land and plowing up land that had long lain fallow.

Solidarity among the nationalities in their joint and creative labor is continuing to develop and spread in our own time. There are examples of this in the hundreds of exceedingly important economic projects being built in RSFSR, in the development of the fuel and power areas in the north of Siberia, in the construction of the Baykal--Amur Main Rail Line and the mighty series of hydropower plants, and in development of the agroindustrial complex of Central Russia.

In its scale and importance the program for further development of the agriculture of the Nonchernozem Zone of RSFSR extends far beyond the limits of the zone and is a task of the entire nation. The decree of the CPSU Central Committee and USSR Council of Ministers entitled "On Measures To Further Develop the Agriculture of the Nonchernozem Zone of RSFSR" (1974) gave vivid expression to the scientific approach to achieving the main goals of the Communist Party's farm policy, which is based on concern for human welfare, on full-fledged development of the productive forces of agriculture in the interests of the fullest satisfaction of the needs of the population for foodstuffs and the need of industry for raw materials.

The program for comprehensive development of a huge region of our country calls for increasing the output of cropping and livestock raising on the kolkhozes

and sovkhozes of the Nonchernozem Zone of RSFSR 2-2.5-fold by 1990 as compared to the level already achieved, which is a major contribution to fulfillment of the Food Program.

At the present time work projects have been set up over an area of about 3 million square kilometers. At the end of 1980 this area included 4,837 kolkhozes, 4,669 sovkhozes, and 1,580 interfarm enterprises and organizations. A sharp increase in the volume of agricultural production, combined with performance of large-scale reclamation projects and construction of economic projects, housing projects and facilities for cultural and consumer services, requires large expenditures of labor. Yet labor resources in the Nonchernozem Zone are being used to a considerable extent in the cities. A large-scale industrial complex has taken shape there, and approximately half of Russia's industrial enterprises are located within the zone, and the share of urban inhabitants is 77 percent. Now all the Soviet people, bound together by close fraternal ties, are coming to the aid of the workers in the Nonchernozem Zone.

Emissaries from the 14 union republics, representatives of many nationalities of RSFSR are working hand in hand with the local population in building new sovkhozes, roads and settlements, and in carrying out reclamation projects over large areas. In the years of the 10th Five-Year Plan workers from Uzbekistan and Belorussia have made an appreciable contribution to development of the economic base for the agriculture of this zone of RSFSR. They fulfilled plans for land reclamation, for the opening up of livestock houses, for construction of housing, as well as for development of the social infrastructure in Ivanovo, Novgorod, Bryansk and other oblasts within the zone. Reclamation workers of LiSSR, who fulfilled their obligations to the Nonchernozem Zone of RSFSR at a level of 104 percent, deserve the good reputation they have for their labor among rural inhabitants. Workers of LaSSR, UkSSR, TuSSR and TaSSR made a sizeable contribution to the general effort, and reclamation workers from GSSR substantially overfulfilled the plan for increasing the economic fertility of the land and other portions of their obligations.

Young people, as always, have been and are in the vanguard in developing the "second frontier." Vouchers from Lenin's Komsomol have sent more than 150,000 young men and women of various nationalities¹ every year to work in building structures for livestock management, housing, cultural and health facilities and children's institutions. Transformation of the Nonchernozem is a vivid and convincing example of how important economic tasks are being performed through concerted efforts.

Thanks to the planned integration of labor resources of the union republics, dynamic development of the material and technical base of the farm sector and a substantial rise in the productivity of fields and livestock operations became possible in the process of developing the productive forces of rural areas. For example, during the last 5-year period there was an appreciable rise (55.3 percent) in the relative adequacy of the fixed agricultural capital of kol-khozes and sovkhozes, and over the period being analyzed the capital of agriculture relative to its labor force rose 52 percent. In the years of the last

¹ PRAVDA, 17 June 1982.

5-year plan 31.5 billion rubles were spent in toto over the entire range of efforts to develop the productive potential of rural areas in the zone.¹

Over the last decade (1970-1980) there was a notable increase in the harvest of grain crops (24 percent), and the output of meat, milk and eggs increased (by 30 percent). Labor productivity rose approximately 24 percent on kolkhozes and sovkhozes and, as noted at the May (1982) Plenum of the CPSU Central Committee, "... profound changes have taken place in the living and working conditions of the Soviet peasantry. Many social problems have been solved effectively."²

Along with other factors in intensification of agricultural production, land improvement projects are given a special place and practical importance in the Nonchernozem Zone of RSFSR. Reclamation workers have already done work on a large scale to carry out the program for draining and irrigating land. For instance, over the period for 1970 to 1980 the area of drained land of agricultural enterprises used in this area increased from 1,457,000 to 2,548,300 hectares, and the area of irrigated land from 61,300 to 646,100 hectares.

In the years of the 11th Five-Year Plan 1.41 million hectares of land were planned for drainage, or 47 percent more than in the previous 5-year period. The task was set of putting under cultivation an additional 360,000 hectares of irrigated land and of building in this zone a large number of sovkhozes, residential settlements and many other production and nonproduction projects.³

In commemoration of the 60th Anniversary of Formation of the USSR and in response to the decisions of the May (1982) Plenum of the CPSU Central Committee all the union republics and many krais and oblasts of RSFSR have assumed additional obligations for participation in carrying out the target program known as "Nonchernozem." Their fulfillment will prove to be a weighty contribution to carrying out the Food Program of the country as a whole. Agriculture is faced by the same main problem as the other sectors of the economy--raising the efficiency and quality of labor in every way. The country is not sparing resources for development of the food resource base. To that end the State Plan for Economic and Social Development of the USSR envisages from all sources of financing in the 11th Five-Year Plan additional investment of 39 billion rubles to develop the plant and equipment of APK's [agroindustrial combines] in the zone.⁴ But alongside the success achieved in development of the agroindustrial complex and especially its central link--agricultural production--there are still many unresolved problems. A sizable portion of agricultural enterprises still have a lack of manpower; on many kolkhozes and sovkhozes there are not enough of those skilled workers who lead the way--machine operators; their turnover rate is high. Because of the shortage and turnover of personnel kolkhozes and sovkhozes are every year falling short many millions of rubles in their agricultural output. Nearly 80 percent of the rise of labor productivity goes to compensate for the shortage of manpower, and only 20 percent to increase the volume of output of farm products. The RSFSR State Committee for Labor,

1 PRAVDA, 17 June 1982.

2 PRAVDA, 25 May 1982.

3 EKONOMICHESKAYA GAZETA, No 34, 1982.

4 PRAVDA, 17 June 1982.

jointly with party and Soviet authorities at the local level, is carrying on a large systematic and planned effort to strengthen the staffing of kolkhozes and sovkhoses and to discover unused potential within the sector for increasing the efficiency of utilization of labor resources in rural areas.

The 10th Five-Year Plan called for resettlement that would bring 7,650 families into the villages of the Nonchernozem as permanent residents; in actuality 8,074 families resettled, amounting to 28,600 persons, including 16,800 able-bodied persons and 5,000 machine operators. In addition, through organized recruitment 106,700 persons were sent to rural localities in the zone and registered on the permanent roster of agricultural enterprises, and 26,100 persons were sent there to participate in seasonal farm work. The activity of organizations in the system of RSFSR State Committee for Labor will expand considerably along these lines in the current 5-year period. Important aid will be given thereby to the farms in successful fulfillment of the Food Program.

The urgency of stabilizing work collectives in agriculture is becoming increasingly acute every year, and measures are needed which can radically reduce the spontaneous and unplanned outflow of the most able-bodied part of the population from rural areas. The point here is that the advances of science and technology can be utilized only by that portion of labor resources which has adequate occupational training and certain physical characteristics for jobs on complicated machines and machinery in present-day dynamic agricultural production.

In this connection we should dwell in a bit more detail on an estimate of the number of people employed in the sphere of agricultural production, which is approximately 15 percent of the labor force of the entire economy. It is nothing uncommon for this to be interpreted by authors of scientific articles as a sufficiently high level of labor supply of kolkhozes and sovkhoses. In our opinion we are dealing here with a case where the concept of adequacy of the labor supply is being replaced by the concept of the share of those employed in agriculture.

The sharp reduction in the share of persons employed in agricultural production in a majority of the advanced capitalist countries cannot serve as a criterion of optimality under the conditions of our country and especially in the Nonchernozem because of the social nature and qualitative characteristics of their rural population. There are many reasons for this, including the age- and sex-specific characteristics of our country's rural population. It is well known that it contains a high share of women and men in the older age groups, who do not have high job mobility and are not inclined to change their place of residence. It is more problematical to find an appropriate use of their labor in industry, transportation and construction. But if we take into account that further intensification of agriculture is inseparably bound up with constant expansion of reclamation projects, with a sharp increase in the volume of production of animal husbandry and such labor-intensive branches of agriculture as the raising of vegetables, fruitgrowing, organization of industrial processing of products right on the farm, then all of this taken together requires attracting a large number of able-bodied people into rural areas. Thus even though there is a tendency toward a reduction in the number of persons employed in

agricultural production, it is still premature to speak of speeding up the movement of manpower from rural localities to the cities and into other sectors of the economy, much less to go about creating specific incentives for this in an organized way.

The new stage in development of the country's productive forces is advancing a different procedure for organizing the use of human resources in both rural localities and also within particular regions, republics and the country as a whole. In the present stage current and prospective balances of labor resources are assuming greater practical importance at all levels of economic construction, including the drafting of such documents within the limits of rural rayons. Disassociated labor plans are no longer sufficient for effective activity of all the integrated economic and managerial organizations of the system of the rayon agroindustrial association (RAPO). There is a need for a unified, but more flexible and accurate instrument for attainment of optimum distribution and use of live labor over the entire farming year or planning period.

We feel that the calculations involved in compiling the balances should also reflect such indicators as the availability of jobs (the planned need for workers), the possible level of labor supply to fill those jobs, and also sources from which to make up the shortage of manpower and channels for redistribution of manpower should there be a surplus of able-bodied people. Compiling current and prospective balances of labor resources to include these indicators will make it possible to substantially improve the quality and effectiveness of the management of our society's principal resource--human resources at all levels of planning and economic activity.

Character and content of the activity of enterprises and organizations united in the system of the agroindustrial complex depend to a very considerable degree on the peculiarities of agricultural production. It is well known that there is no practical possibility of absolutely eliminating seasonal fluctuations in distribution of inputs of farm labor from period to period within the farming year. As a result there have been, there are and there will be seasonal ups and downs (with varying quantitative characteristics, of course), maximums and minimums in the needs for manpower not only within agricultural production proper, but also in the production operations related to it. An important conclusion follows from this to the effect that labor may become even more seasonal in rural localities in connection with the activity of the RAPO. For example, in the period when the crops are being harvested and the bringing in of livestock feed is still continuing there is a sharp rise in the number of transport operations and an increased need for manpower by enterprises storing and processing agricultural raw materials, so that there is a greater strain on the production operations of other partners of the RAPO as well.

If the activity of the RAPO is to be given a smooth pace in the period of strenuous farm work, there is a need for a more refined system of flexible management of the labor potential of rural areas. Under the specific conditions of the zone's agroindustrial complex there is no decrease, but there is in fact an increase in the need of rural areas for aid in the form of labor not only from residents of the cities in central Russia, but also from an inflow of

human resources from those regions of the country which have a larger supply of labor.

A more flexible mechanism for management of labor resources at all levels of economic construction--from the individual farm up to the country as a whole--is indispensable to planned fulfillment of the USSR Food Program for the Period up to the Year 1990. The latter circumstance raises the problem of regional and interrepublic use of labor resources. It is a certainty that fulfillment of the set of measures for radical socioeconomic transformation of rural areas set forth by the May (1982) Plenum of the CPSU Central Committee will have a favorable influence toward rectifying the demographic situation and will stimulate a quantitative and qualitative improvement of the work force in all units of the agroindustrial complex. Of course, in such a complicated production system it is also indispensable to have more efficient and vigorous activity of labor agencies at the local level and at the center, as well as closer coordination of planning agencies, economic agencies and labor organizations in drafting economically sound and interrelated measures concerning the use of labor resources of regions with a labor surplus.

Cooperation of the country's different regions in the shaping, distribution and use of the labor potential constitutes a major potential for social and economic development of our society in the present stage of building communism. Establishment of correctly balanced proportions between job vacancies and workers will promote a further equalization of urban and rural areas in their economic development, of the standard of living of the people, and this is a principal condition for the saving of live labor, reduction of the unorganized movement of population, and lower turnover of manpower.

It must be assumed that the joint efforts of the peoples of different nationalities in carrying out the large-scale programs for further development of the material and technical base of advanced socialism is a natural reflection of the policy of the party in the constant endeavor to speed up socioeconomic progress in the country. But solving the new, more complicated and larger-scale problems of increasing the well-being of the workers and augmenting the might of our homeland is imposing higher requirements on use of physical and labor resources at all levels of economic construction. An objective need has arisen for a further strengthening and expansion of relations between the country's individual republics and regions for the sake of fuller and more efficient use of labor resources. We need state current and long-range comprehensive target programs for redistribution and optimum use of labor resources in a regional breakdown based on a reckoning of the economic, organizational and legal incentives promoting unconditional solution of problems of this kind. A reckoning of the changing manpower needs of the economy's farm sector must at the same time be at the center of everyday attention.

Rural workers, along with our entire people, are working with enthusiasm to carry out the historic goals outlined by the 26th CPSU Congress. The patriotic orientation received a new thrust after the May (1982) Plenum of the CPSU Central Committee, which approved the USSR Food Program and adopted important decrees of the party and government related to its fulfillment.

The decisions of the May Plenum of the CPSU Central Committee and the 60th Anniversary of Formation of the USSR will indubitably serve as a powerful stimulation of the people's work effort and successful fulfillment of the magnificent social and economic programs for development of the country's productive forces.

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EDUCATION

CHANGING PRIORITIES REQUIRE NEW TRAINING PROGRAMS

Moscow EKONOMICHESKIYE NAUKI in Russian No 12, Dec 82 pp 73-82

[Article by V. Yakimov, professor and doctor of economic sciences: "Improving the Cultural and Professional Standards for Workers and the Qualitative Development of Labor Resources in the USSR"; passages enclosed in slantlines are printed either in italics or in 4-point type, as indicated]

[Text] The constructive strength of socialism, combining more than 100 nations and nationalities of the USSR into a single fraternal family, is manifested in all aspects of social existence. "Within the tightly knit family of disparate peoples, there is dynamic growth of the economic systems of all Soviet republics. Today each of them is characterized by modernized industry, agriculture, science and genuine cultural growth."¹

One of the most outstanding testimonies to the huge successes in social development achieved by the Soviet republics is the radical changes taking place in the structure of the combined labor force. Unprecedented growth has occurred in the labor potential of the nation, including therein all labor resources available to society or its individual components. The value of a nation's labor potential is characterized by the strength of its labor capacity, the man-hour resources of its workers--depending on their age and sex--and also--what is particularly important--the degree of development of the physical and spiritual capacities of the people for work. There is at present a vast labor force operating in the national economy of the USSR--approximately 126 million workers, including kolkhoz and service workers. The leading role belongs to the working class. Almost two thirds of the employed population--around 80 million people--is composed of workers, in fact, of this number, four out of every five have at least some high school education. With the industrialization of agricultural production, the work of kolkhoz workers is now on a par with that of industrial workers. The specific contribution of kolkhoz workers with high school or higher educations has increased from 1.8 percent in 1939 to 63.4 percent in 1981.² The size of the intelligentsia is increasing at an accelerated pace--a fact which can be linked to the expanding scientific-technical revolution, as well as to the strong growth of education, culture, public health and other fields in the nonproductive sector. In the country at present, every fourth worker is involved primarily in work of an intellectual nature.³

The growth of the labor potential of our country is being accomplished primarily on the basis of /the high-level development of labor resources/[in italics], and the

improvement of cultural and professional standards for workers in all republics and all sectors of the national economy. Cultural and professional standards, being the socioeconomic category which reflects the degree of general and technical education, as well as skilled professional and economic training of all participants in the production process, serve as a common indicator of the development of man's spiritual capacity for work. The physical capabilities of people also remains a very important aspect of the capacity for work. Good physical condition presupposes the presence of such indispensable elements of work capacity as strength, endurance, dexterity, agility and visual acuity, among others. Under the conditions established by modern scientific and technological progress, however, the successful development of physical capacities for work requires educational training as well. /The crucial requirement for substantive improvement of the labor force in a developing socialist society is the constant improvement of cultural and professional standards for workers./[in italics]

The growth of cultural and professional standards for workers is an essential characteristic of the socioeconomic development of a socialist society. On the one hand, current tendencies in the modification of national production which make use of the latest advances in science and technology, based on the complex mechanization and automation of all sectors of the national economy, are establishing an objective need for a corresponding improvement in the quality of the labor force: scientific skills are becoming an indispensable element in the work capabilities of all participants in national production. On the other hand, socialism, which subordinates production to the goal of unstinting improvement of public welfare, and all-around personal development, provides for each member of society, regardless of social status or national affiliation, the potential for "spiritual ferment", i. e., the acquisition of skills and the improvement of the level of general and specialized education. As an outgrowth of this, all republics of the Soviet Union have developed skilled personnel--national brigades comprising the working class and the intelligentsia, while the social aspect of the peasantry has been radically altered.

It is pointed out in the CPSU Central Committee decree, "On the 60th Anniversary of the Formation of the Union of Soviet Socialist Republics", that our country has essentially solved the problem of equalizing the levels of economic development of the Soviet republics, and guaranteed actual, as well as judicial equality of all nations and nationalities. This fact is revealed most forcefully in the level of education of the populace.

Prior to the Great October socialist revolution, the fate of the peoples in many of the outlying regions of the country was total illiteracy. Even as late as the 1920's, the proportion of people lacking basic reading and writing skills amounted to 90 to 96 percent in the Central Asian republics, and 82 percent in Kazakhstan.⁴ With the establishment of socialism in the country, illiteracy was eliminated in all republics, though significant variations in levels of education remain(see table 1).

At the present time, the variations existing in 1939 have been virtually eliminated. In 1939, as shown by the table, the gap between the upper and the lower value for the characteristic being examined was at that time quite significant--approaching

100 points; by 1981 it had been reduced to 16 points, i. e., by a factor of 6. It should be noted at this point that the still existing slight variations in the educational training of the population are related, as a rule, to the fact that this characteristic is somewhat lower in those republics which entered into the Soviet Union at a later date and those which had been subjected to fascist occupation during the war years.

Table 1. Educational Level of USSR Workers (those having at least some secondary or higher education, per 1000 people employed in the national economy)*

Area Examined	1939	1981	Educational Level of Republic Workers with Respect to Union Average	
			1939	1981
USSR	123	833	100	100
RSFSR	124	830	100	99.7
Ukrainian SSR	139	841	113	100
Belorussian SSR	113	797	91	95
Uzbek SSR	61	875	49	105
Kazakh SSR	99	836	80	100
Georgian SSR	163	877	132	105
Azerbaijan SSR	122	856	99	102
Lithuanian SSR	...	751	...	90
Moldavian SSR	...	761	...	91
Latvian SSR	...	821	...	98
Kirghiz SSR	56	833	45	100
Tajik SSR	45	801	36	96
Armenian SSR	135	891	109	106
Turkmen SSR	78	852	63	102
Estonian SSR	...	819	...	98

* Derived from: NARODNOYE KHOZYASTVO SSSR V 1980, Moscow, 1981, p 29.

The elevation and standardization of the educational level of the population is taking place through implementation of universal secondary education for young people. Mention was made at the 26th CPSU Congress that "The major emphasis today is on increasing the quality of education, including vocational and moral instruction in school, doing away with formalism in evaluating the performances of teachers and students, and actually strengthening the relationship of education to life experiences, while improving the preparation of scholars for socially useful work".⁵ The role of the nonspecialized school in developing a skilled work force is much greater today than at any time in the past. A graduate of our school system must now have the technical training, and possess the knowledge of general principles of modern production processes, to be prepared for successful mastery of the most complex professions.

The decree of the CPSU Central Committee and USSR Council of Ministers, "On the Further Improvement of the Education and Instruction of Students in General Education Schools and their Preparation for Work", outlined measures aimed at fundamental

improvement of vocational training in schools: significant increase in the amount of time spent on vocational education of upperclassmen; expansion of the network of interscholastic work-study production combines, training sections in industrial enterprises, school laboratories and study halls, as well as replenishment of their material supply base; additional development was accorded to on-the-job training brigades and other vocational scholastic associations; each high school was assigned basic enterprises(organizations). As the decree noted, "under present conditions, as the nation has accomplished the transition to universal secondary education, high school graduates must, in the course of their studies, acquire both in-depth knowledge of scientific principles and work habits for employment in the national economy; they must approach mastery of a specific profession."⁶ Currently, a great many schools and on-the-job training combines, having access to the appropriate material base and to teams of instructors, are accomplishing the preparation of highly skilled personnel(machine operators, tractor mechanics, drivers, construction crews, livestock breeders), which permits graduates to go to work in their chosen specialties immediately upon completion of schooling.

Closely related to the vocational training of the younger generation is the matter of establishing professional orientation. The attained level of development in material production and the nonproducing sphere is such that, along with the increased importance of nonspecialized and technical training, one sees a rather high degree of mobility within specific quantified proportions of the population of workers in various professions and specialties. Each new generation of workers should be distributed among the spheres of socially useful work in correspondence to these proportions, as they exist at any given time. Such a task can be successfully achieved only through the implementation of highly flexible and adaptable systems of professional orientation, training, increasing proficiency and cross-training of workers.

/General educational schooling must occupy a central position in efforts to organize professional orientation.

/At the present time, the school collectives are not fully discharging this responsibility. Special surveys conducted among graduates of schools in the city of Kostroma and in the Latvian SSR, for example, showed that the school had exerted a decisive influence on choice of profession in only 12-16 percent of the students. By far the majority of those finishing school were guided by the advice of parents, friends and comrades.⁷ The best results were obtained in those cases where professional orientation efforts were carried out by the school in cooperation with joint vocational enterprises, departments and agencies. In the Moldavian SSR, for example, 20 ministries and departments established advisory groups, while panels created to study the issue of professional orientation are functioning in seven others; appropriate pamphlets, posters and the essential methodological studies were released. In a number of industrial enterprises and associations, special professional orientation services are operated, or professional staff consultants are employed; about 1000 staff members of industrial enterprises and organizations carry out this work on a voluntary basis. They structure their activities in close cooperation with national educational elements and Goskomtrud[State Committee for Labor and Wages]. It would appear that the need has arrived to sharply increase resources targeted for the organization of professional orientation efforts in the country and to implement the training of professional orientation specialists on a broad scale./[in 4-point type]

One of the most important functions of the national educational system in the USSR is to guarantee to each member of society--regardless of nationality--instruction in the Russian language--a language of major international importance, which provides all of our peoples with broad access to the riches of world civilization. In many republics, the value of the Russian language is shown by its ability to mobilize the population, and to effectively attract rural youth to jobs in industry, construction and the transportation and communications fields. The accomplishment of such far-reaching social and national economic objectives as exploitation of the fuel-energy and mineral resources of the Siberian, Far East, Far North, BAM [Baykal-Amur Railway] regions, as well as development of the Non-Chernozem Zone, calls for the cooperative strengthening of the labor force in all republics, and transferral of some labor resources from certain republics to others. This process is noticeably accelerated with the acquisition of Russian language skills by representatives of every nation and nationality grouping in the USSR, every one of which, for its part, has a vital interest in the success of the entire multinational Soviet government, which, after all, also depends in large part on the prosperity of each republic, each region.

An important factor in the socioeconomic development of a nation is the vocational-technical education of the population, which is accomplished through a network of vocational-technical training institutions, various technical courses and schools within industrial enterprises and organizations, as well as through a system of professional skill improvement.

Vocational-technical schools now play a leading role in the training of qualified personnel for public professions.

/The first training institutions devoted to vocational-technical education in the majority of the republics were established following the October Revolution. The number of such schools operating during the period 1921-1923 was as follows: Belorussian SSR--3; Kazakhstan--6; Turkmenistan--3; Uzbekistan--2; Georgia--2; Kirghizia--1; Azerbaijan--1.⁸ Each of these institutions has trained scores of young people. During the formative years of socialism, vocational-technical education was molded into a smoothly functioning system and became the popularly accepted means for the training of skilled professionals. It is continuing its successful development in every one of the union republics (see table 2). From 1950 to 1980, the annual number of professional graduates from these training centers increased nearly fivefold, and by factors of 23 and 22 in the Uzbek SSR and Moldavian SSR, and by factors greater than 18 in the Armenian SSR and Kirghiz SSR. The vocational-technical education system has seen intensive development in all of the autonomous republics as well./[in 4-point type]

The expansion of professional training within the vocational-technical education system was necessitated by the accelerated development of manufacturing, construction, commercial and service industries in all of the republics, and by the widespread mechanization of agricultural production. It has facilitated the achievement of a major socioeconomic objective--the establishment and reinforcement of national brigades of the working class; it has increased their social effectiveness, their cultural awareness and professional mastery; it has effected deep-seated changes in the social makeup and cultural life of the kokhoz workers of all Soviet republics.

And yet there exists a remarkable imbalance in the development of vocational-technical education from region to region within the country. In 1980, the USSR average number of skilled workers turned out by vocational-technical training schools was 91 for every 10,000 people in the general population. This contrasts to 40 in the Tajik SSR, and 40-60 workers in the Estonian, Turkmen and Georgian SSR's. The 26th CPSU Congress directed its attention to the need for broader implementation of skilled training programs for workers from the indigenous nationalities, with primary concentration on rural youth.⁹

Right now, the bases have already been laid for far-reaching changes in the implementation of skilled training programs for the public professions--and these changes will be relevant to the specific nature of current conditions. It is vocational-technical training which is becoming the predominant mode by which young workers enter into productivity. During the 60's, only a third of the young men and women who had trained for such professions received the training in schools, while during the 10th Five-Year Plan, as many as two thirds of those entering the productive sphere had. A new type of vocational-technical training facility has been proliferating--secondary schools featuring a three to four-year course of study designed to take young students who have completed an eight-year regimen of general studies and turn them out as skilled workers with high school educations. During the 1970-71 school year, these types of facilities were engaged in training 180,000 individuals, or about 7 percent of the student population of the professional-technical education system, whereas in the 1980-81 school year, this figure had become 2,203,000 individuals, or more than 53 percent of the 3,951,000 students engaged in such training(including FZU[industrial training] schools and departmental vocational-technical training facilities).¹⁰

Table 2. Comparison of Training of Skilled Workers in Vocational-Technical Training Institutions in the Soviet Republics(in thousands of workers)*

<u>Area Examined</u>	<u>1950</u>	<u>1980</u>	<u>1980 as a percentage of 1950</u>	<u>Number of workers trained in 1980 per 10,000 population</u>
USSR	493.4	2430.5	495	91
RSFSR	315.4	1399.3	444	100
Ukrainian SSR	112.7	382.7	338	76
Belorussian SSR	9.8	83.9	850	80
Uzbek SSR	5.5	115.2	2300	70
Kazakh SSR	18.4	175.7	972	117
Georgian SSR	5.8	34.1	580	60
Azerbaijan SSR	7.6	56.4	740	90
Lithuanian SSR	3.4	24.7	720	70
Moldavian SSR	1.3	29.1	2230	71
Latvian SSR	4.6	20.7	450	80
Kirghiz SSR	1.7	30.8	1810	80
Tajik SSR	1.2	17.9	1490	40
Armenian SSR	1.8	33.2	1840	100
Turkmen SSR	1.3	18.9	1450	60
Estonian SSR	2.9	7.9	270	50

*Based on: NARODNOYE OBRAZOVANIYE, NAUKA I KUL'TURA V SSSR, Moscow, 1971, p 222; NARODNOYE KHOZYASTVO SSSR V 1980, p 375, 10.

There has been continuous successful expansion in the network of technical schools--training institutions which conduct vocational training of young high school graduates. In 1981, 779,000 persons (19.7 percent) received training in them. It is expected that the 1980's will bring completion of the shift in the USSR State Committee for Vocational-Technical Education system to training workers exclusively in high schools and technical schools.¹¹

Currently, there are several new problems arising within the infrastructure of vocational training for personnel in the public professions. The preeminent position in this area is still occupied by the question of training for new professions and specialties taking place directly in the workplace. In recent times, this method has been used to train approximately 6 million workers annually, or two and a half times as many as were trained in vocational-technical schools.¹² Such training is carried out primarily by means of the individual-brigade approach, or through the use of short-term courses, which, however, do not provide workers with sufficient--from the perspective of production growth--theoretical training or broad technical knowledge. A number of scholarly investigations has shown that graduates of vocational-technical schools are quicker than those receiving professional training on-the-job in adapting to work requirements, they attain higher productivity levels, they are more successful in acquiring high ratings, and they are more actively involved in participation in scientific and technological research, as well as in management of national production.

It should be taken into account that the need for improvement in the training of workers for the public professions is also strongly indicated by the experience in this area of foreign nations having highly developed industrial bases. Thus, the average training period for a skilled worker right now amounts to 28-32 months in Japan and the USA, and 18-22 months in the GDR and the Czechoslovakian SSR, while in our country, it amounts to 4-5 months.¹³ It is not within the scope of this article to give a full accounting of the extent and nature of the professional training received by workers in the public professions, as has commonly been done with regard to general, secondary specialized and higher education. Nonetheless, such an accounting might bear great importance for the improvement of planning for social development and personnel training and cross-training systems, for the implementation of measures related to the introduction of new technology, and, in the final analysis, for ensuring balanced and well-proportioned growth in production resources and the labor force.

A special urgency attaches to problems associated with the improvement of vocational-technical training for farm workers. At present, kolkhozes, sovkhoses and interfarm agricultural enterprises are primarily staffed by specialists; the average for a single kolkhoz turns out to be 26, and for each sovkhos and interfarm enterprise, there are 31 workers with specialized secondary or higher educations. The training of farm mechanical specialists is proceeding quite successfully--primarily by means of the vocational-technical school system. Tractor mechanics and operators, combine operators, and drivers are represented by the following percentages of the total number of workers in agricultural enterprises for the years indicated: 1940--4.5 percent (kolkhozes--4.4, sovkhoses--5.7); 1965--10.9 percent (kolkhozes--9.9, sovkhoses--13); 1980--17.2 percent (kolkhozes--16.2, sovkhoses--17.4).¹⁴ Moreover, farm-oriented vocational-technical schools are presently placing the heaviest emphasis on the preparation of tractor mechanics. They are primarily employed in the crop production sector.

In recent years, there has been an on-going process of intensive mechanization in the field of animal husbandry, while the production infrastructure is being made the focus of ever greater development in rural industry. From year to year, the demand is growing for workers skilled in such professions as: mechanical specialist for cattle breeding farms, metalworker qualified in the operation and repair of farm equipment, operator, troubleshooter, electrician, mechanic for equipment used in soil improvement and irrigation work, and specialists in preserving and processing agricultural products. Nonetheless, specialists in such fields are being trained primarily with short-term courses. Farm-oriented vocational-technical schools are producing them in extremely small numbers. There are about five million workers in the field of animal husbandry on the nation's kolkhozes and sovkhoses. It is rare, however, for any farm--even modern cattle breeding complexes--to have graduates of vocational-technical schools. Thus, the training of personnel for the animal husbandry field has not as yet achieved large-scale dimensions. In 1980, there were 64,000 such workers coming out of the schools, i. e., only 8.7 percent of the total number of those being trained as skilled workers in agricultural professions.¹⁵

The May(1982) Plenum of the CPSU Central Committee approved the USSR Farm Production Program for the period extending to 1990. It calls for complex as well as balanced development of all sectors comprising the agroindustrial complex, augmenting all sectors of production with skilled personnel, and the improvement of working and living conditions in rural areas. There can be no doubt that a vocational-technical education system which gives thorough consideration to the needs of the agricultural sector and its workers would make a sizeable contribution to the realization of the objectives of the May(1982) Plenum of the CPSU Central Committee.

/The relative backwardness of public vocational-technical education in the country has had definite historically-based objective causes. Among these are the low level of mechanization of a number of production processes, the existence of a large number of specialties or types of occupations not requiring extensive vocational training, or requiring none at all. At the present time, in the material production sphere, more than 40 million persons(not counting repairmen and troubleshooters) are engaged at manual labor, including about 40 percent of industrial workers, more than half of all construction workers, and more than two thirds of those employed in the trades, agriculture and materials handling.¹⁶ The level of mechanization is especially low in auxilliary and subsidiary work. The current economic changeover being carried out through the use of intensive methods of development will lead to vast changes in the technological level of production processes./[in 4-point type]

It is evident that modern conditions give rise to the sort of situation in the development of a skilled labor force in which /it becomes necessary to expand the vocational-technical education system to dimensions which will permit every young person to obtain a skill prior to entering the work place./[in italics] This means that, in addition to universal secondary education, there will be/universal vocational education for young people./[in italics] The criterion by which members of society are allowed to receive vocational training should be successful completion of special in-residence training in a vocational-technical training institution(in certain cases, in curricula established by industrial enterprises

and organizations, or in an intensive vocational education program conducted in a general-educational school), including a comprehensive technical education and resulting mastery by the student of a specific profession with a skill level appropriate to the work requirements of the national economy. The necessary conditions presently exist in the country for the gradual implementation of universal vocational education for young people, as well as for developing modern professional job skills in that segment of the population which heretofore had not had the opportunity to acquire them. The major condition to be met in achieving these goals is extensive development of the network of vocational-technical training centers.

It would be a mistake to ignore the fact that important resources for organizing vocational training for workers exist right in the workplace. But these resources remain for the most part untapped: in the area of vocational-technical development of workers who have already completed their basic training; in providing workers with second and/or a combination of professions in line with the requirements of scientific and technological progress and the objectives established for increased production efficiency. As far as the initial vocational training of workers is concerned, its development in an on-the-job setting and its very feasibility are dependent upon the presence of the proper conditions. The individual and brigade approach to training, which currently predominates, does not ensure that workers receive the appropriate technical knowledge and cannot be the means for implementing universal vocational education for young people. A course-oriented approach, in which the course of study approximates that found in vocational-technical training facilities, would more completely meet requirements for vocational training.

One of the major social advances in the development of the USSR and all of the country's republics is the broad scope of secondary and higher specialized education. At present, the training of specialists is proceeding at a quite adequate pace for all sectors of the productive and nonproductive spheres. The number of workers employed in the national economy with secondary and higher specialized educations has increased from 2.4 million in 1941 to 28.6 million in 1980. The number of students enrolled in the nation's institutes of higher learning for the same 40 years grew from 811,700 to 5,235,200, or by a factor of 6.4--in fact, in the Kazakh and Tajik SSR's, the factor was 25; in the Moldavian SSR, 20.5; in the Kirghiz SSR, 18; in the Uzbek SSR, 14.6; in the Turkmen SSR, 12; in the Belorussian SSR, 8.2.¹⁷ The relative number of students (per 10,000 population) in these, as in all other republics of the USSR as well, is now greater than in such highly developed capitalist countries as England, the FRG, Italy, Canada, Japan and France. "Massive groups of technical engineering and scientific personnel, artists, teachers and doctors have been assembled and are continuing to grow in every republic. Also of great importance is the continued improvement of the general planning system and the quality of specialist training, the need for more precise estimates in this area of the pattern of actual requirements in the republics and the USSR as a whole, and more complete exploitation of the useful potential of highly trained specialists in the interests of communist development".¹⁸

Insofar as the scale of specialist training in technical institutes is concerned, the current needs of the nation are, for the most part, being satisfied, and for the foreseeable future, there is no need for a quantum increase in the outputs of institutions of higher learning and technical training schools. Moreover, with

the maintenance of a stable, quantified level of specialist training, the number of specialists in the national economy will steadily increase. The fact of the matter is that in the 1980's, people who graduated from training institutions in the 1940's and at the beginning of the 50's, when there were considerably fewer being graduated, will be reaching retirement age. For example, in 1940, the nation's institutions of higher education graduated 126,100; in 1950, 176,900; and in 1980, 817,300 persons.¹⁹ Should the present high number of upper level graduates continue unchanged, the number of specialists with higher educations entering the national economy will be 4.6-6.5 times greater in the 1980's, and 2.3-4 times greater in the 1990's, than the number of those leaving. Roughly the same situation will exist with regard to specialists having secondary educations.

The basic problems associated with the training of specialized personnel are: the need for improvement in the quality of training; more intelligent use of such specialists in the national economy; improvement of the territorial distribution of institutions of higher learning and technical schools, taking into account the needs of production efforts under development in newer regions of the country. There is a definite need to respond to the changing requirements of society for trained personnel, providing for their timely training in new specialties in the face of reductions in the number of students in those skill areas in which, for one reason or another, there is no need to increase the number of specialists. In agriculture, for example, there already exists a large contingent of agronomists and animal husbandry technicians, while, at the same time, there are still too few engineers, mechanics and economists. The CPSU Central Committee and USSR Council of Ministers decree, "On the Need for Continuous Replenishment of Kolkhozes, Sovkhozes and Other Agricultural Enterprises with Management Personnel and Specialists and the Expansion of their Role and Responsibility in the Development of Agricultural Production", which was adopted by the May(1982) Plenum of the CPSU Central Committee, in order to better provide kolkhozes, sovkhozes and other agricultural enterprises with various types of engineers, veterinarians and accountants, called for a broadening of their training--and primarily in training facilities located in the following areas: the Non-Chernozem Zone; the Central-Chernozem Region of the RSFSR; Siberia; North Kazakhstan; the Far East. This was envisioned within the limits of the plans adopted for 1982-85 implementation in secondary and higher specialized training facilities.²⁰

A question related to increased quality in specialist training concerns the ratio of the number of graduates of institutions of higher learning to the number from secondary training institutions. The latter, in 1980, trained 1,274,700 specialists, or 56 percent more than the former. This particular ratio is quite stable: in 1960, the superiority of the number of specialists trained in technical schools over the number trained in institutions of higher learning amounted to a 54 percent advantage.²¹ The idea has been put forward that there is a serious lag in the pace of development of higher specialized education compared to secondary. It occurs to us that this concept, while fully consistent with conditions as they existed 10 to 15 years ago, can hardly be considered indisputable today--at a time when rapid and sweeping changes are taking place in the socioeconomic and scientific-technological development of our society. Taking these changes into account, it would seem that new standards must be developed for a proper evaluation of this ratio of the number of specialists with higher educations to those with secondary educations.

It is apparent that there is already a need to embark upon a restructuring of the system of training specialists, taking into account the imminent changes in conditions of social life at the end of the 20th and into the beginning of 21st centuries. It must be realized that a situation is gradually unfolding wherein the overwhelming mass of those employed in the national economy will consist of workers having full secondary and vocational educations, with 11 to 12 total years of training. Even now, graduates of technical and secondary vocational-technical schools receive almost as many hours of instruction as those completing studies in secondary specialized training institutions. Modern production is making increasing demands on training standards, not only for workers in public professions, but also for specialists. Seemingly, it would be advisable to gradually transfer to the university the function of training all specialists, i. e., even including those who are receiving secondary specialized education. In connection with this, a question arises concerning clarification of the prospects for development in the functions technical schools as well. It would be useful to study the possibilities and the advisability of introducing a stepped system of study in the university, with a varying number of years of required study, depending on the category to be awarded to the specialist.

The conditions engendered by a well-developed socialism fully allow for such regularity of socioeconomic growth as is seen in the systematic expansion of the creation of a skilled labor force. This regularity is founded upon objective requirements for the development of the national economy and is provided by unity in the national education system, and by continuity in all types of training facilities.

Skilled personnel, kolkhoz workers, specialists, agricultural and other kinds of managers who skillfully employ state-of-the-art technology and scientific advances serve as the basis for the steady growth of the USSR economy, as well as the economies of all its republics and regions. The constant improvement of cultural and professional standards for society's workers, the growth of labor productivity, the intelligent use of labor resources--all permit steady development of every sector of the national economy and that of each of the republics; they make it possible to bring new regions under development and establish vast territorial-production complexes, to achieve continuing improvement in the efficiency of national production and the standard of living of the Soviet people.

FOOTNOTES

1. "On the 60th Anniversary of the Formation of the USSR." CPSU Central Committee decree from 19 Feb 82, Moscow, 1982, p 7.
2. NARODNOYE KHOZYASTVO SSSR V 1980, Moscow, 1981, p 30, 282, 357.
3. "Materialy XXVI S'yezda KPSS"[Materials on the 26th CPSU Congress], Moscow, 1981, p 53.
4. L. I. Brezhnev, "Lenin Course. Speeches and Articles", Moscow, 1975, Vol 4, p 50.
5. "Materialy..." op. cit., p 60.

6. "Party and Government Decrees Regarding Economic Issues"(July 77-March 79), Moscow, 1977, Vol 12, p 181.
7. A. V. Solov'yev, "Professional'naya orientatsiya v sotsialisticheskom obshchestve"[Professional Orientation in Socialist Society], Moscow, 1979, p 13; "Formirovaniye dostoynoy smeny sel'skikh truzhenikov"[Forming a Worthy Generation of Rural Workers], Moscow, 1980, p 68.
8. A. A. Bulgakov, "Professial'no-tekhnicheskoye obrazovaniye v SSSR na sovremennom etapye"[Vocational-Technical Education in the USSR in the Modern Era], Moscow, 1977, pp 122-123.
9. "Materialy..." op. cit., p 54.
10. NARODNOYE KHOZYASTVO SSSR V 1970, Moscow, 1971, p 627; NARODNOYE KHOZYASTVO SSSR V 1980, p 455.
11. Speech by the chairman of the USSR State Committee for Vocational-Technical Education, A. A. Bulgakov, at the 19th congress of the All-Union Leninist Komsomol, KOMSOMOL'SKAYA PRAVDA, 1982, May 21.
12. NARODNOYE KHOZYASTVO SSSR V 1980, p 376.
13. V. Sidorov, "Labor Efficiency and the Quality of Personnel Training", EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZBODSTVA, 1981, No 1, p 159.
14. NARODNOYE KHOZYASTVO SSSR V 1980, pp 201, 282, 283, 289.
15. A. V. Solov'yev, "Formirovaniye..." op. cit., p 22.
16. Yu. Demin, "Manual Labor--Onto the Shoulders of Machines", KOMMUNIST, 1981, No 11, p 20.
17. NARODNOYE KHOZYASTVO SSSR V 1980, pp 369, 466.
18. "On the 60th Anniversary..." op. cit., p 11.
19. "National Education, Science and Culture in the USSR", Moscow, 1971, p 129; NARODNOYE KHOZYASTVO SSSR V 1980, p 472.
20. "Prodovol'stvennaya programma SSSR na period do 1990 goda i mery po yeye realizatsii. Materialy mayskogo Plenuma TsK SSSR 1982 goda"[Food Supply Program of the USSR for the Period Ending 1990, and Measures for its Implementation. Materials on the May Plenum of the 1982 CPSU Central Committee], Moscow, 1982, p 95.
21. NARODNOYE KHOZYASTVO SSSR V 1980, p 472; "Narodnoye obrazovaniye, nauka i kul'tura v SSSR"[National Education, Science and Culture in the USSR], Moscow, 1971, p 192.

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DEMOGRAPHY

STATISTICS ON DEMOGRAPHY, EDUCATION AS INDICATED

National, City Vital Statistics

Moscow VESTNIK STATISTIKI in Russian No 11, Nov 82 pp 63-77

[Excerpts] II. Natural Population Growth in the USSR

1. Number of Males and Females as of 1 January 1982

<u>Republics</u>	<u>Total Popula- tion, thousands of persons</u>	<u>Males Alone</u>	<u>Females Alone</u>	<u>Percentage of Total</u>	
				<u>Males</u>	<u>Females</u>
USSR	268,844	125,689	143,155	46.8	53.2
RSFSR	140,017	64,804	75,213	46.3	53.7
Ukrainian SSR	50,307	23,078	27,229	45.9	54.1
Belorussian SSR	9,744	4,540	5,204	46.6	53.4
Uzbek SSR	16,591	8,158	8,433	49.2	50.8
Kazakh SSR	15,253	7,366	7,887	48.3	51.7
Georgian SSR	5,100	2,401	2,699	47.1	52.9
Azerbaijan SSR	6,303	3,074	3,229	48.8	51.2
Lithuanian SSR	3,474	1,637	1,837	47.1	52.9
Moldavian SSR	4,025	1,902	2,123	47.3	52.7
Latvian SSR	2,552	1,179	1,373	46.2	53.8
Kirghiz SSR	3,724	1,813	1,911	48.7	51.3
Tajik SSR	4,119	2,034	2,085	49.4	50.6
Armenian SSR	3,169	1,546	1,623	48.8	51.2
Turkmen SSR	2,970	1,463	1,507	49.3	50.7
Estonian SSR	1,496	694	802	46.4	53.6

2. Birthrate, Mortality Rate and Natural Population Growth

<u>Year</u>	<u>Relative to Total Population, per 1,000</u>		
	<u>Number of Births</u>	<u>Number of Deaths</u>	<u>Natural Growth</u>
1980	18.3	10.3	8.0
1981	18.5	10.2	8.3

3. Distribution of the Number of Births, Deaths and Number of Marriages Registered by Months in 1981, in thousands

<u>Months</u>	<u>Number of Births</u>	<u>Number of Deaths</u>	<u>Number of Registered Marriages</u>
Total	4,961.4	2,742.1	2,788.1
January	437.2	253.0	222.9
February	381.4	225.1	228.6
March	425.2	241.6	219.0
April	414.3	225.4	196.4
May	431.3	236.1	187.9
June	423.3	229.6	232.1
July	439.5	227.6	242.6
August	421.6	217.0	316.1
September	402.0	214.9	252.6
October	399.3	220.7	251.4
November	392.1	221.8	222.1
December	394.2	229.3	216.4

4. Distribution of Births by Number of Previous Children in the Family During 1981

<u>Number of Births, in thousands</u>	<u>Number of Previous Births in Family</u>					
	<u>None</u>	<u>One</u>	<u>Two</u>	<u>Three</u>	<u>Four</u>	
4,961.4	2,236.5	1,608.6	502.9	227.0	140.4	
	<u>Five</u>	<u>Six</u>	<u>Seven</u>	<u>Eight</u>	<u>Nine or More</u>	<u>Not Indicated</u>
	85.8	56.0	39.2	26.5	33.6	4.9

5. Age-Specific Indicators of the Birthrate in Urban Settlements and Rural Localities (number of births per 1,000 women in the respective age group)

<u>Age</u>	<u>1980-1981</u>		
	<u>Breakdown</u>		
	<u>Total</u>	<u>Urban Settlements</u>	<u>Rural Localities</u>
15-49 years*	71.6	61.3	94.2
Under 20**	41.0	38.9	44.6
20-24	177.8	148.8	249.7
25-29	124.5	105.0	174.1
30-34	66.9	54.0	103.8
35-39	29.6	19.6	51.9
40-44	9.3	4.5	19.2
45-49	1.4	0.4	3.1

* Including children born to older mothers.

** The number of women aged 15-19 was provisionally taken in determining the relative indicators for this age group.

6. Age-Specific Indicators of the Birthrate by Union Republics (number of births per 1,000 women of the respective age group)

<u>Republics</u>	<u>15-49 Years*</u>	<u>Under 20**</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
USSR	71.6	41.0	177.8	124.5	66.9	29.6	9.3	1.4
RSFSR	60.6	43.6	157.6	102.0	52.0	18.8	4.6	0.4
Ukrainian SSR	58.2	48.3	163.0	102.2	50.8	18.2	4.2	0.3
Belorussian SSR	62.8	32.2	172.0	117.2	57.0	20.8	5.0	0.4
Uzbek SSR	149.6	32.3	273.6	272.5	194.6	122.4	54.3	11.3
Kazakh SSR	94.4	39.6	206.4	158.9	96.1	56.7	21.0	3.5
Georgian SSR	69.5	43.1	190.0	124.2	61.9	23.2	6.7	0.9
Azerbaijan SSR	99.8	18.8	194.6	212.2	128.0	62.8	25.1	3.8
Lithuanian SSR	58.5	24.1	151.9	116.4	63.7	29.6	8.8	0.7
Moldavian SSR	76.3	34.7	193.5	133.7	78.6	30.1	9.0	0.9
Latvian SSR	55.1	39.0	152.3	104.3	54.1	22.3	5.1	0.3
Kirghiz SSR	129.2	41.0	270.0	212.2	140.6	99.5	43.9	10.5
Tajik SSR	168.1	36.1	308.3	286.8	225.5	162.8	83.2	22.7
Armenian SSR	85.2	45.0	204.3	132.4	56.3	21.4	6.9	1.4
Turkmen SSR	148.2	21.6	246.5	273.9	204.0	151.9	71.1	15.0
Estonian SSR	60.3	43.8	167.4	111.9	55.4	22.0	4.9	0.3

* Including children born to older mothers.

** The number of women aged 15-19 was provisionally taken in determining the relative indicators for this age group.

7. Death Rate of the Total Population Owing to Diseases of the Circulatory System in 1980, 1981

<u>Diseases</u>	<u>Number of Deaths, in thousands</u>		<u>Number of Deaths Per 1,000 Inhabitants</u>	
	<u>1980</u>	<u>1981</u>	<u>1980</u>	<u>1981</u>
Total number of deaths owing to all causes	2,743.8	2,742.1	1,033.3	1,024.2
Owing to diseases of the circulatory system alone	1,441.5	1,436.0	542.8	536.4
Further breakdown:				
Atherosclerotic cardiosclerosis	599.4	599.1	225.7	223.8
Hypertension (all forms)	233.4	225.3	87.9	84.2
Involving vascular lesions of the brain	150.6	150.1	56.7	56.1
Involving myocardial infarctus	10.9	9.6	4.1	3.6
Vascular lesions of the brain without hypertension	294.6	304.7	110.9	113.8
Other forms of ischemic disease of the heart and myocardial infarctus (not involving hypertension)	189.0	186.5	71.2	69.6

7 (continued)

<u>Diseases</u>	<u>Number of Deaths, in thousands</u>		<u>Number of Deaths Per 1,000 Inhabitants</u>	
	<u>1980</u>	<u>1981</u>	<u>1980</u>	<u>1981</u>
Myocardial infarctus alone	62.4	61.9	23.5	23.1
Active rheumatism and chronic rheumatic diseases of the heart	26.8	24.8	10.1	9.3
Other diseases of the circula- tory system	98.3	95.6	37.0	35.7

8. Death Rate of the Population Owing to Malignant Neoplasms in 1980, 1981

<u>Diseases</u>	<u>Number of Deaths, in thousands</u>		<u>Number of Deaths Per 100,000 Inhabitants</u>	
	<u>1980</u>	<u>1981</u>	<u>1980</u>	<u>1981</u>
Total number of deaths owing to all causes	2,743.8	2,742.1	1,033.3	1,024.2
Owing to malignant neoplasms alone	371.8	380.4	140.0	142.1
Further breakdown:				
Of the oral cavity, lips and pharynx	7.0	7.1	2.6	2.6
Of the esophagus	15.0	14.1	5.7	5.3
Of the stomach	88.5	87.8	33.3	32.8
Of the small intestine, in- cluding the duodenum	16.6	4.1	6.3	1.5
Of the colon (large intes- tine)		14.4		5.4
Of the rectum, rectosigmoid connection and anus	17.1	18.9	6.4	7.1
Of other digestive organs	29.4	33.2	11.1	12.4
Of the larynx	7.0	7.1	2.6	2.7
Of the trachea, bronchi, lungs	68.8	71.5	25.9	26.7
Of the skin	3.5	3.6	1.3	1.4
Of the mammary gland	20.3	20.8	7.6	7.8
Of the cervix	12.1	12.2	4.6	4.5
Of other malignant neoplasms of the uterus	8.1	8.2	3.1	3.1
Of other and undetermined female genital organs	12.1	12.8	4.6	4.8
Of the prostate gland	5.0	5.2	1.9	1.9
Of other male sexual organs	1.0	1.0	0.4	0.4
Of the urinary organs	13.3	13.7	5.0	5.1
Leukemia	11.6	11.6	4.3	4.3

8 (continued)

<u>Diseases</u>	<u>Number of Deaths, in thousands</u>		<u>Number of Deaths Per 100,000 Inhabitants</u>	
	<u>1980</u>	<u>1981</u>	<u>1980</u>	<u>1981</u>
Of other neoplasms of the lymphatic and haemopoietic tissue	8.4	8.8	3.1	3.3
Of other and unspecified lo- calizations*	27.0	24.3	10.2	9.0

* The localization "malignant neoplasms of other respiratory organs" and "malignant neoplasms of bone and connective tissue" are included in "other and unspecified localizations" because data on these localizations for 1981 were not comparable with the data for 1980, since beginning in 1981 a new nomenclature of causes of death, based on the International Statistical Classification of Diseases, Traumas and Causes of Death, ninth revision (1975), was introduced in the country.

9. Distribution of the Number of First Marriages by Age in 1981, in thousands

<u>Age</u>	<u>Number of Persons Getting Married</u>		<u>Number Getting Married for First Time</u>	
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
Total number of persons getting married	2,788.1	2,788.1	2,314.9	2,339.6
Under 20 years	135.0	746.0	134.5	740.0
20-24	1,592.2	1,275.3	1,545.4	1,198.7
25-29	534.4	345.1	426.9	236.3
30-34	193.4	149.5	102.0	66.4
35-39	69.0	52.9	25.8	17.1
40-44	83.5	65.7	24.5	18.2
45-49	45.5	40.7	12.5	12.9
50-54	44.8	41.4	12.4	16.4
55-59	27.8	29.9	8.5	12.9
60 and over	62.0	41.1	21.9	20.3
Age not known	0.5	0.5	0.5	0.4

10. Marriages According to the Age of the Groom and Bride in 1981, in thousands

<u>Groom's Age</u>	<u>Total Number Getting Married</u>	<u>Bride's Age</u>				
		<u>Under 20 Years</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>
Total number getting married	2,788.1	746.0	1,275.3	345.1	149.5	52.9
Under 20 years	135.0	96.2	36.4	2.1	0.2	0.0
20-24	1,592.2	569.5	913.3	96.5	11.1	1.2

10 (continued)

<u>Groom's Age</u>	<u>Total Number Getting Married</u>	<u>Bride's Age</u>				
		<u>Under 20 Years</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>
25-29	534.4	72.4	269.7	148.7	37.1	4.8
30-34	193.4	6.6	45.3	70.6	53.2	11.3
35-39	69.0	0.7	6.7	15.9	22.7	11.5
40-44	83.5	0.3	2.8	8.5	18.4	15.2
45-49	45.5	0.1	0.6	1.9	4.7	5.6
50-54	44.8	0.0	0.2	0.6	1.5	2.3
55-59	27.8	0.0	0.1	0.2	0.4	0.7
60 and over	62.0	0.0	0.0	0.1	0.2	0.3
Age not indicated	0.5	0.2	0.2	0.0	0.0	0.0

	<u>40-44</u>	<u>45-49</u>	<u>50-54</u>	<u>55-59</u>	<u>60 and Over</u>	<u>Age Not Indicated</u>
Total number getting married	65.7	40.7	41.4	29.9	41.1	0.5
Under 20 years	0.0	0.0	0.0	--	0.1	0.0
20-24	0.2	0.1	0.0	0.0	0.0	0.3
25-29	1.4	0.2	0.0	0.0	0.0	0.1
30-34	5.3	0.9	0.2	0.0	0.0	0.0
35-39	8.5	2.1	0.6	0.1	0.2	0.0
40-44	24.4	9.6	3.5	0.7	0.1	0.0
45-49	13.8	10.8	6.1	1.6	0.3	0.0
50-54	8.3	10.5	14.3	5.8	1.3	0.0
55-59	2.6	4.1	9.2	7.9	2.6	0.0
60 and over	1.2	2.4	7.5	13.8	36.5	0.0
Age not indicated	0.0	0.0	0.0	0.0	0.0	0.1

11. Number of Registered Divorces Distributed by Length of the Marriage Dissolved and the Age of the Man and Woman in 1981, in thousands

<u>Age, Sex</u>	<u>Total Num- ber of Registered Divorces</u>	<u>Breakdown by Length of Marriage, in years</u>						<u>Un- known</u>
		<u>Under 1 Year</u>	<u>1-2</u>	<u>3-4</u>	<u>5-9</u>	<u>10-19</u>	<u>20 or More</u>	
Total	929.5	33.6	147.7	166.4	261.4	201.8	114.9	3.7
Under 20 years								
Men	1.4	0.4	1.0	0.0	--	--	--	0.0
Women	14.4	4.0	9.4	0.9	--	--	--	0.1
20-24								
Men	117.3	12.6	59.2	36.2	8.9	--	--	0.4
Women	199.1	13.3	75.0	77.9	32.1	--	--	0.8
25-29								
Men	246.0	8.4	46.2	79.6	106.4	4.7	--	0.7
Women	231.4	6.4	30.2	49.3	128.8	16.0	--	0.7

11 (continued)

Age, Sex	Total Number of Registered Divorces	Breakdown by Length of Marriage, in years						
		Under 1 Year	1-2	3-4	5-9	10-19	20 or More	Un-known
30-34								
Men	196.5	4.5	18.5	26.2	92.0	54.4	--	0.9
Women	166.4	3.7	13.8	17.7	57.3	73.4	--	0.5
35-39								
Men	89.6	1.9	6.3	7.8	20.4	50.6	2.3	0.3
Women	76.4	1.4	4.8	5.8	14.3	44.2	5.7	0.2
40-44								
Men	120.3	2.1	6.8	7.7	17.6	61.8	23.8	0.5
Women	104.7	1.8	5.6	6.1	13.7	42.3	34.8	0.4
45-49								
Men	61.2	1.1	3.0	3.2	6.5	15.8	31.3	0.3
Women	50.3	0.8	2.4	2.8	5.2	12.2	26.6	0.3
50-54								
Men	49.6	0.9	2.6	2.5	4.5	8.0	30.8	0.3
Women	41.3	0.8	2.4	2.2	3.9	6.9	24.9	0.2
55-59								
Men	22.5	0.5	1.3	1.3	2.1	3.1	14.1	0.1
Women	22.4	0.6	1.5	1.2	2.2	3.0	13.8	0.1
60 and over								
Men	24.0	1.2	2.7	1.7	2.7	3.1	12.5	0.1
Women	21.9	0.8	2.5	2.3	3.6	3.5	9.1	0.1
Age not indicated								
Men	1.1	0.0	0.1	0.2	0.3	0.3	0.1	0.1
Women	1.2	0.0	0.1	0.2	0.3	0.3	0.0	0.3

III. Number and Composition of Scientists by Academic Degrees and Academic Titles (at the end of the year, number of persons)

Republic, Indicator	1960	1970	1975	1980	1981
USSR					
Number of scientists	354,158	927,709	1,223,428	1,373,263	1,411,237
Number with an academic degree:					
Doctor of science	10,945	23,616	32,264	37,747	38,697
Candidate of science	98,262	224,490	326,767	396,244	409,693
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	9,907	18,095	22,942	27,381	28,072
Docent	36,155	68,581	87,884	110,698	115,668

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Senior scientific associate	20,259	39,005	53,323	65,951	68,647
Junior scientific associate and assistant	26,693	48,849	44,978	41,101	40,165
RSFSR					
Number of scientists	242,872	631,111	838,473	937,665	963,440
Number with an academic degree:					
Doctor of science	7,929	16,135	22,105	25,838	26,549
Candidate of science	67,146	145,071	212,363	257,329	265,791
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	6,784	11,859	15,146	17,885	18,373
Docent	23,610	42,926	53,783	66,902	69,619
Senior scientific associate	14,202	25,184	34,574	44,012	45,881
Junior scientific associate and assistant	17,783	32,141	30,367	29,423	29,051
Ukrainian SSR					
Number of scientists	46,657	129,781	171,478	195,782	200,506
Number with an academic degree:					
Doctor of science	1,343	3,123	4,163	4,842	4,953
Candidate of science	13,622	33,317	47,308	58,002	60,423
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	1,308	2,590	3,211	3,818	3,856
Docent	5,892	12,079	15,106	19,221	20,324
Senior scientific associate	2,290	5,085	6,850	8,395	8,821
Junior scientific associate and assistant	1,731	3,516	2,266	1,880	1,525

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Belorussian SSR					
Number of scientists	6,840	21,863	31,020	38,130	39,417
Number with an academic degree:					
Doctor of science	181	425	624	779	812
Candidate of science	2,013	5,564	8,362	10,820	11,242
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	185	382	485	657	679
Docent	855	1,962	2,724	3,679	3,831
Senior scientific associate	369	855	1,278	1,709	1,827
Junior scientific associate and assistant	718	1,036	1,001	1,273	1,194
Uzbek SSR					
Number of scientists	10,329	25,244	30,835	35,288	36,517
Number with an academic degree:					
Doctor of science	222	494	745	939	960
Candidate of science	2,442	6,907	10,505	12,992	13,390
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	241	423	560	764	792
Docent	1,021	2,126	2,958	3,941	4,223
Senior scientific associate	431	956	1,291	1,509	1,584
Junior scientific associate and assistant	687	890	1,255	1,593	1,927
Kazakh SSR					
Number of scientists	9,623	26,802	32,011	37,390	38,485
Number with an academic degree:					
Doctor of science	157	421	607	708	737
Candidate of science	2,123	6,272	9,642	11,621	11,983

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	178	340	468	557	571
Docent	793	2,009	2,844	3,769	3,956
Senior scientific associate	566	1,097	1,655	1,776	1,840
Junior scientific associate and assistant	1,530	1,646	1,646	772	743
Georgian SSR					
Number of scientists	9,137	20,160	24,941	25,198	25,842
Number with an academic degree:					
Doctor of science	430	989	1,228	1,335	1,318
Candidate of science	3,207	5,860	7,679	9,104	9,274
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	392	814	911	1,045	1,034
Docent	1,195	1,698	2,183	2,696	2,738
Senior scientific associate	739	1,742	1,912	2,019	2,040
Junior scientific associate and assistant	1,184	3,084	1,608	616	658
Azerbaijan SSR					
Number of scientists	7,226	17,082	21,280	21,993	22,558
Number with an academic degree:					
Doctor of science	189	652	811	907	917
Candidate of science	1,983	5,346	7,196	8,186	8,487
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	204	506	623	708	723
Docent	743	1,141	1,862	2,174	2,273

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Senior scientific associate	474	1,197	1,523	1,515	1,548
Junior scientific associate and assistant	682	2,042	3,145	2,323	2,698
Lithuanian SSR					
Number of scientists	3,320	8,978	12,538	14,307	14,497
Number with an academic degree:					
Doctor of science	31	182	274	347	369
Candidate of science	758	2,710	4,339	5,197	5,393
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	72	165	231	331	357
Docent	285	923	1,348	1,841	1,934
Senior scientific associate	87	389	676	864	923
Junior scientific associate and assistant	227	362	83	32	27
Moldavian SSR					
Number of scientists	1,999	5,695	7,309	8,807	9,040
Number with an academic degree:					
Doctor of science	48	113	192	241	251
Candidate of science	564	1,834	2,882	3,506	3,621
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	39	97	142	183	204
Docent	198	519	699	922	978
Senior scientific associate	133	284	435	524	543
Junior scientific associate and assistant	196	589	668	76	73

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Latvian SSR					
Number of scientists	3,348	8,895	12,024	12,585	12,933
Number with an academic degree:					
Doctor of science	64	175	262	332	337
Candidate of science	898	2,517	3,484	4,172	4,293
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	97	165	200	250	257
Docent	346	719	1,052	1,320	1,366
Senior scientific associate	177	387	543	669	685
Junior scientific associate and assistant	295	650	565	662	637
Kirghiz SSR					
Number of scientists	2,315	5,867	7,131	8,194	8,588
Number with an academic degree:					
Doctor of science	56	128	172	198	200
Candidate of science	587	1,572	2,214	2,588	2,682
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	64	114	132	170	174
Docent	197	412	545	684	706
Senior scientific associate	110	309	462	469	484
Junior scientific associate and assistant	172	37	31	18	10
Tajik SSR					
Number of scientists	2,154	5,067	6,629	7,590	7,667
Number with an academic degree:					
Doctor of science	33	102	149	183	187
Candidate of science	433	1,364	2,126	2,505	2,550

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	40	90	120	147	155
Docent	150	358	571	785	818
Senior scientific associate	111	204	335	409	416
Junior scientific associate and assistant	298	1,131	510	417	385
Armenian SSR					
Number of scientists	4,275	12,808	17,138	19,059	19,935
Number with an academic degree:					
Doctor of science	164	482	630	700	704
Candidate of science	1,502	3,346	4,734	5,624	5,829
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	161	370	479	540	552
Docent	562	1,006	1,268	1,566	1,657
Senior scientific associate	364	821	1,091	1,262	1,185
Junior scientific associate and assistant	520	1,176	1,424	1,642	855
Turkmen SSR					
Number of scientists	1,836	3,649	4,634	5,030	5,234
Number with an academic degree:					
Doctor of science	32	62	92	108	114
Candidate of science	361	1,200	1,714	1,998	2,037
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	52	54	62	84	90
Docent	102	239	331	437	461

III (continued)

<u>Republic, Indicator</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Senior scientific associate	77	186	261	308	327
Junior scientific associate and assistant	329	13	1	--	--
Estonian SSR					
Number of scientists	2,227	4,707	5,987	6,245	6,578
Number with an academic degree:					
Doctor of science	66	133	210	290	289
Candidate of science	623	1,610	2,219	2,600	2,698
Number within the total number of scientists who have an academic title:					
Member of an academy, corresponding member of an academy, professor	90	126	172	242	255
Docent	206	464	610	761	784
Senior scientific associate	129	299	437	511	543
Junior scientific associate and assistant	341	536	408	374	382

IV. Statistical Data on the Capital of the Union Republics and on Cities With a Population Over 1 Million

1. Size of the Population as of 1 January 1982

<u>City</u>	<u>Population, thousands of persons</u>	<u>City</u>	<u>Population, thousands of persons</u>
USSR	268,844	Kishinev	559
Alma-Ata	1,001	Kuybyshev	1,243
Ashkhabad	332	Leningrad*	4,202
Baku*	1,060	Minsk	1,370
Vilnius	514	Moscow*	8,111
Gorkiy	1,373	Novosibirsk	1,357
Dnepropetrovsk	1,114	Odessa	1,085
Donetsk	1,047	Omsk	1,061
Dushanbe	519	Perm	1,028
Yerevan	1,076	Riga	858
Kazan	1,023	Sverdlovsk	1,252
Kiev	2,297	Tallinn	449

1 (continued)

<u>City</u>	<u>Population, thousands of persons</u>	<u>City</u>	<u>Population, thousands of persons</u>
Tashkent	1,902	Frunze	565
Tbilisi	1,110	Kharkov	1,503
Ufa	1,023	Chelyabinsk	1,066

* The population of the cities Moscow, Leningrad and Baku is 8,302,000, 4,722,000 and 1,616,000 persons, respectively, when their subordinate urban settlements are included.

2. Birthrate, Mortality Rate, Natural Population Growth, Marriages and Divorces in 1981

<u>City</u>	<u>Number of Births</u>	<u>Number of Deaths</u>	<u>Natural Population Growth</u>	<u>Number of Marriages</u>	<u>Number of Divorces</u>
USSR	4,961,363	2,742,101	2,219,262	2,788,075	929,537
Alma-Ata	18,422	8,845	9,577	12,286	6,099
Ashkhabad	7,305	2,491	4,814	3,223	1,231
Baku*	30,602	12,547	18,055	14,318	3,734
Vilnius	7,476	3,522	3,954	5,791	1,902
Gorkiy	17,601	14,018	3,583	12,960	5,742
Dnepropetrovsk	15,416	10,622	4,794	12,240	5,799
Donetsk	14,088	9,671	4,417	11,837	6,197
Dushanbe	11,018	3,775	7,243	4,822	2,197
Yerevan	21,453	5,656	15,797	10,771	2,003
Kazan	14,330	9,391	4,939	9,436	4,469
Kiev	34,995	18,202	16,793	23,662	12,102
Kishinev	10,308	3,741	6,567	6,348	2,727
Kuybyshev	16,888	12,535	4,353	11,900	6,435
Leningrad*	64,715	54,833	9,882	55,712	27,602
Minsk	25,465	7,117	18,348	13,897	6,223
Moscow*	106,379	97,003	9,376	87,234	43,586
Novosibirsk	21,545	13,155	8,390	16,036	7,954
Odessa	13,008	10,748	2,260	11,859	6,136
Omsk	18,502	8,701	9,801	12,800	5,975
Perm	15,040	9,553	5,487	9,691	4,297
Riga	11,291	9,739	1,552	9,549	5,257
Sverdlovsk	18,279	11,712	6,567	12,802	5,570
Tallinn	6,593	4,553	2,040	4,796	2,466
Tashkent	37,364	15,151	22,213	18,643	6,454
Tbilisi	18,256	8,973	9,283	11,397	3,215
Ufa	15,283	7,466	7,817	8,900	4,240
Frunze	11,081	4,452	6,629	6,222	2,285
Kharkov	20,803	15,092	5,711	16,488	7,615
Chelyabinsk	16,527	9,486	7,041	10,972	5,458

2 (continued)

City	Per 1,000 Inhabitants				
	Births	Deaths	Natural Growth	Marriages	Divorces
USSR	18.5	10.2	8.3	10.4	3.5
Alma-Ata	18.7	9.0	9.7	12.4	6.2
Ashkhabad	22.2	7.6	14.6	9.8	3.7
Baku*	19.1	7.8	11.3	8.9	2.3
Vilnius	14.7	6.9	7.8	11.4	3.7
Gorkiy	12.8	10.2	2.6	9.5	4.2
Dnepropetrovsk	13.9	9.6	4.3	11.1	5.2
Donetsk	13.5	9.3	4.2	11.3	5.9
Dushanbe	21.4	7.3	14.1	9.4	4.3
Yerevan	20.1	5.3	14.8	10.1	1.9
Kazan	14.1	9.2	4.9	9.3	4.4
Kiev	15.4	8.0	7.4	10.4	5.3
Kishinev	18.8	6.8	12.0	11.6	5.0
Kuybyshev	13.6	10.1	3.5	9.6	5.2
Leningrad*	13.8	11.7	2.1	11.9	5.9
Minsk	18.8	5.3	13.5	10.3	4.6
Moscow*	12.9	11.8	1.1	10.6	5.3
Novosibirsk	16.0	9.7	6.3	11.9	5.9
Odessa	12.1	10.0	2.1	11.0	5.7
Omsk	17.6	8.3	9.3	12.2	5.7
Perm	14.7	9.3	5.4	9.5	4.2
Riga	13.2	11.4	1.8	11.2	6.2
Sverdlovsk	14.7	9.4	5.3	10.3	4.5
Tallinn	14.8	10.2	4.6	10.8	5.5
Tashkent	19.9	8.1	11.8	9.9	3.4
Tbilisi	16.6	8.1	8.5	10.3	2.9
Ufa	15.0	7.3	7.7	8.8	4.2
Frunze	19.8	8.0	11.8	11.1	4.1
Kharkov	13.9	10.1	3.8	11.0	5.1
Chelyabinsk	15.6	8.9	6.7	10.3	5.1

* Including urban settlements under jurisdiction of the city soviet.

3. Housing Construction in 1981

City	Dwelling Units Built by State and Cooperative Enterprises and Organizations		Dwelling Units Built Per 1,000 Persons Representing Natural Population Growth, in units
	Number of Dwelling Units, in thousands	Their Total Floor Area, in thousands of square meters	
USSR	1,998.0	106,441	900
Alma-Ata*	9.8	521	1,023

3 (continued)

<u>City</u>	<u>Dwelling Units Built by State and Cooperative Enterprises and Organizations</u>		<u>Dwelling Units Built Per 1,000 Persons Represent- ing Natural Population Growth, in units</u>
	<u>Number of Dwelling Units, in thousands</u>	<u>Their Total Floor Area, in thousands of square meters</u>	
Ashkhabad	1.6	105	329
Baku*	9.0	550	496
Vilnius	5.1	262	1,282
Gorkiy	12.7	655	3,548
Dushanbe	4.0	200	549
Dnepropetrovsk	11.5	589	2,392
Donetsk	7.6	392	1,716
Yerevan	6.8	401	430
Kazan	8.5	384	1,720
Kiev	26.5	1,314	1,581
Kishinev	5.7	288	873
Kuybyshev	10.0	502	2,295
Leningrad*	25.8	1,300	2,609
Minsk*	14.6	790	785
Moscow*	71.4	3,868	7,617
Novosibirsk	8.8	431	1,043
Odessa	5.8	302	2,562
Omsk	9.1	444	929
Perm	8.4	406	1,536
Riga	5.6	309	3,582
Sverdlovsk	11.1	520	1,683
Tallinn	4.4	242	2,176
Tashkent	15.3	865	687
Tbilisi	9.5	582	1,010
Frunze	4.5	226	686
Ufa	6.3	328	802
Kharkov	14.7	702	2,572
Chelyabinsk	8.3	438	1,172

* Including urban settlements under jurisdiction of the city soviet.

4. City Housing Stock at the End of 1981

<u>City</u>	<u>Thousands of Square Meters of Total (ef- fective) Space of Housing</u>	<u>City</u>	<u>Thousands of Square Meters of Total (ef- fective) Space of Housing</u>
USSR	2,270,548	Ashkhabad	3,498
Alma-Ata	12,848	Baku	17,702

4 (continued)

<u>City</u>	<u>Thousands of Square Meters of Total (ef- fective) Space of Housing</u>	<u>City</u>	<u>Thousands of Square Meters of Total (ef- fective) Space of Housing</u>
Vilnius	7,024	Novosibirsk	17,898
Gorkiy	18,336	Odessa	13,837
Dnepropetrovsk	15,895	Omsk	13,673
Donetsk	15,393	Perm	12,720
Dushanbe	5,517	Riga	13,753
Yerevan	12,482	Sverdlovsk	17,142
Kazan	12,900	Tallinn	7,382
Kiev	34,298	Tashkent	19,726
Kishinev	7,044	Tbilisi	15,031
Kuybyshev	16,067	Ufa	12,416
Leningrad	72,331	Frunze	6,585
Minsk	18,444	Kharkov	22,226
Moscow	137,570	Chelyabinsk	14,324

6. General Public Schools at the Beginning of the 1981/82 Academic Year

<u>City</u>	<u>Number of Schools</u>	<u>Pupils in Them, thousands</u>	<u>Number of Grad- uates of 8-Year General Public School in 1981, thousands of persons</u>	<u>Number of Grad- uates of General Secondary Public Schools in 1981, thousands of persons</u>
USSR	143,247	44,256	4,187	3,899
Alma-Ata	176	136	11	11
Ashkhabad	66	55	5	3
Baku	386	273	27	22
Vilnius	85	71	6	6
Gorkiy	210	166	14	15
Dnepropetrovsk	178	144	12	14
Donetsk	185	128	13	13
Dushanbe	117	94	9	6
Yerevan	234	165	15	12
Kazan	171	129	11	13
Kiev	306	298	24	26
Kishinev	80	70	5	5
Kuybyshev	198	154	13	16
Leningrad	647	494	41	37
Minsk	190	184	15	17
Moscow	1,195	865	73	70
Novosibirsk	225	175	14	14
Odessa	141	133	11	11
Omsk	177	141	12	12

6 (continued)

<u>City</u>	<u>Number of Schools</u>	<u>Pupils in Them, thousands</u>	<u>Number of Grad- uates of 8-Year General Public School in 1981, thousands of persons</u>	<u>Number of Grad- uates of General Secondary Public Schools in 1981, thousands of persons</u>
Perm	159	127	10	10
Riga	139	107	9	8
Sverdlovsk	203	162	14	15
Tallinn	77	63	5	4
Tashkent	321	301	27	22
Tbilisi	220	175	15	13
Ufa	147	125	12	13
Frunze	82	76	6	6
Kharkov	192	183	15	15
Chelyabinsk	177	145	12	13

7. Higher and Secondary Specialized Educational Institutions at the Beginning of the 1981/82 Academic Year

<u>City</u>	<u>Number of Higher Educational In- stitutions</u>	<u>Number of Students in Them, thousands of persons</u>	<u>Number of Gradu- ates of Secondary Institutions in 1981, thousands of persons</u>
USSR	891	5,284.5	831.2
Alma-Ata	16	92.1	13.2
Ashkhabad	7	29.0	4.5
Baku	13	88.1	15.3
Vilnius	6	32.4	5.2
Gorkiy	10	62.4	9.9
Dnepropetrovsk	9	60.0	10.1
Donetsk	5	42.5	7.7
Dushanbe	8	43.6	7.2
Yerevan	11	54.3	10.0
Kazan	11	65.3	10.7
Kiev	18	149.0	25.0
Kishinev	6	42.6	6.5
Kuybyshev	10	64.9	10.2
Leningrad	41	280.1	42.2
Minsk	14	96.2	17.4
Moscow	76	632.6	94.0
Novosibirsk	14	85.2	13.0
Odessa	15	84.7	14.1
Omsk	10	51.5	7.7
Perm	7	50.9	7.9
Riga	7	34.9	5.3

7 (continued)

<u>City</u>	<u>Number of Higher Educational Institutions</u>	<u>Number of Students in Them, thousands of persons</u>	<u>Number of Graduates of Secondary Institutions in 1981, thousands of persons</u>
Sverdlovsk	14,	88.0	13.9
Tallinn	4	13.8	2.0
Tashkent	19	160.0	24.7
Tbilisi	11	67.2	11.4
Ufa	7	49.2	7.3
Frunze	8	46.5	7.1
Kharkov	19	122.8	19.9
Chelyabinsk	7	44.0	7.1

	<u>Number of Secondary Specialized Educational Institutions</u>	<u>Number of Pupils in Them, thousands of persons</u>	<u>Number of Graduates of Secondary Specialized Educational Institutions, in 1981, thousands of persons</u>
USSR	4,393	4,556.8	1,287.3
Alma-Ata	18	28.6	7.3
Ashkhabad	14	17.9	5.2
Baku	26	40.1	11.9
Vilnius	15	19.2	5.8
Gorkiy	25	39.7	10.9
Dnepropetrovsk	29	37.0	11.1
Donetsk	22	30.5	8.8
Dushanbe	13	18.0	5.0
Yerevan	26	26.6	8.9
Kazan	21	26.9	8.0
Kiev	40	61.8	18.6
Kishinev	17	22.9	7.0
Kuybyshev	28	39.4	10.6
Leningrad	86	106.8	30.9
Minsk	23	34.3	10.0
Moscow	141	196.3	54.9
Novosibirsk	36	39.0	10.6
Odessa	26	35.6	9.9
Omsk	29	33.9	10.5
Perm	20	23.9	6.6
Riga	22	26.5	7.2
Sverdlovsk	34	46.1	12.5
Tallinn	12	13.2	3.2
Tashkent	36	53.5	14.1
Tbilisi	25	21.6	6.5

7 (continued)

<u>City</u>	<u>Number of Secondary Specialized Educa- tional Institutions</u>	<u>Number of Pupils in Them, thou- sands of persons</u>	<u>Number of Gradu- ates of Secondary Specialized Edu- cational Institu- tions, in 1981, thousands of persons</u>
Ufa	23	33.1	9.8
Frunze	14	22.0	6.2
Kharkov	37	53.8	16.5
Chelyabinsk	24	31.5	9.2

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Further Data on Education, Labor Force

Moscow VESTNIK STATISTIKI in Russian No 12, Dec 82 pp 64-75

[Excerpts] I. In Honor of the 60th Anniversary of Formation of the USSR--
Public Education, Science and Culture in the USSR

"Citizens of the USSR have the right to education. This right is guaranteed by making all types of education free and by accomplishing universal compulsory secondary education of young people ..." (From Article 45 of the USSR Constitution)

"The unified interethnic culture of the Soviet people will grow and become stronger on the blessed soil of mature socialism.... Socialist in its content, diverse in its national forms, internationalist in its spirit and character, Soviet culture has become a great force toward ideological and moral solidarity of the nationalities and ethnic minorities of the Soviet Union." (Decree of the CPSU Central Committee dated 19 February 1982 and entitled "On the 60th Anniversary of Formation of the Union of Soviet Socialist Republics")

1. Number of Pupils Involved in All Types of Study by Union Republics (at the beginning of the academic year; in thousands of persons)

<u>Republics</u>	<u>1965/66</u>	<u>1975/76</u>	<u>1981/82</u>
USSR	71,857	92,605	102,822
RSFSR	41,129	49,574	53,809
Ukrainian SSR	13,058	16,985	18,807
Belorussian SSR	2,500	3,391	3,723
Uzbek SSR	3,109	5,217	6,187
Kazakh SSR	3,931	5,492	6,504
Georgian SSR	1,174	1,410	1,504
Azerbaijan SSR	1,406	2,158	2,375
Lithuanian SSR	848	1,162	1,273
Moldavian SSR	987	1,483	1,667
Latvian SSR	610	820	935

1 (continued)

<u>Republics</u>	<u>1965/66</u>	<u>1975/76</u>	<u>1981/82</u>
Kirghiz SSR	798	1,259	1,523
Tajik SSR	721	1,241	1,542
Armenian SSR	690	1,072	1,245
Turkmen SSR	533	867	1,084
Estonian SSR	363	474	644

2. General Public Schools (at the beginning of the academic year)

<u>Indicator</u>	<u>1922/23</u>	<u>1940/41</u>	<u>1965/66</u>	<u>1970/71</u>	<u>1981/82</u>
Number of general public schools, in thousands	89.0	199.0	214.0	190.0	143.0
Number of students in them, in millions	7.4	35.6	48.3	49.2	44.3
Distribution:					
In grades 1-3	6.0	16.1	15.4	15.3	14.1
In grades 4-8	1.3	18.2	24.9	26.3	20.7
In grades 9-10 (11)	0.1	1.3	8.0	7.6	9.5
Number of teachers, in millions	0.2	1.2	2.5	2.6	2.6

3. Number of Pupils in General Public Schools Per 10,000 Inhabitants, by Union Republics (at the beginning of the academic year)

<u>Republics</u>	<u>1922/23</u>	<u>1981/82</u>	<u>Republics</u>	<u>1922/23</u>	<u>1981/82</u>
USSR	544	1,648	Lithuanian SSR	1,283*	1,698
RSFSR	568	1,438	Moldavian SSR	470	1,825
Ukrainian SSR	592	1,492	Latvian SSR	1,272*	1,373
Belorussian SSR	578	1,555	Kirghiz SSR	227	2,421
Uzbek SSR	72	2,501	Tajik SSR	27	2,659
Kazakh SSR	228	2,155	Armenian SSR	868	1,871
Georgian SSR	1,083	1,855	Turkmen SSR	124	2,508
Azerbaijan SSR	479	2,450	Estonian SSR	1,143*	1,462

* 1940/41.

4. Number of Pupils Graduating From General Public Schools, (thousands of persons)

<u>Year</u>	<u>Partial Completion for Secondary School</u>		<u>Secondary School Graduates</u>	
	<u>Total</u>	<u>Average for Year</u>	<u>Total</u>	<u>Average for Year</u>
1922	94		41	
1923-1925	341	113.7	169	56.3
1926-1928	520	173.4	185	61.7

4 (continued)

<u>Year</u>	<u>Partial Completion for Secondary School</u>		<u>Secondary School Graduates</u>	
	<u>Total</u>	<u>Average for Year</u>	<u>Total</u>	<u>Average for Year</u>
1929-1932	1,223	305.8	286	71.5
1933-1937	3,907	781.5	486	97.2
1938-1940	4,925	1,641.8	727	242.4
1941-1945	6,394	1,278.8	780	156.0
1946-1950	6,000	1,200.0	1,053	210.7
1951-1955	16,394	3,278.7	3,595	719.1
1956-1960	11,527	2,305.4	6,964	1,392.9
1961-1965	14,962	2,992.3	5,407	1,081.3
1966-1970	22,175	4,435.0	13,261	2,652.2
1971-1975	25,081	5,016.1	15,310	3,062.0
1976-1980	23,628	4,725.6	20,132	4,026.3
1981	4,187		3,899	

5. Number of Children in Preschool Institutions (at the end of the year; in thousands)

<u>Republics</u>	<u>1922</u>	<u>1940</u>	<u>1965</u>	<u>1970</u>	<u>1981</u>
USSR	98.0	1,953	7,673	9,281	14,755
RSFSR	66.0	1,266	4,939	5,666	8,381
Ukrainian SSR	19.0	319	1,184	1,574	2,473
Belorussian SSR	3.0	64	201	274	511
Uzbek SSR	2.0	74	275	348	996
Kazakh SSR	1.0	37	420	564	902
Georgian SSR	2.0	48	98	116	170
Azerbaijan SSR	2.0	57	89	111	150
Lithuanian SSR	--	14	48	80	160
Moldavian SSR	--	5	66	91	273
Latvian SSR	--	6	53	72	117
Kirghiz SSR	--	7	68	90	154
Tajik SSR	--	8	55	68	113
Armenian SSR	2.0	18	64	90	139
Turkmen SSR	0.5	25	72	78	132
Estonian SSR	--	5	41	59	84

Aside from permanent preschool institutions, seasonal preschool institutions and children's playgrounds are organized in the summertime; in 1981 they served 5.1 million children, including 1.9 million children of preschool age.

6. Number of Students of Higher Educational Institutions and Pupils of Secondary Specialized Educational Institutions Per 10,000 Inhabitants by Union Republics (at the beginning of the academic year)

Republics	Higher Educational Institutions				
	1922/23	1940/41	1965/66	1970/71	1981/82
USSR	16	41	166	188	197
RSFSR	18	43	185	204	219
Ukrainian SSR	15	47	151	170	176
Belorussian SSR	9	24	120	154	183
Uzbek SSR	7	28	159	192	172
Kazakh SSR	--	16	120	151	176
Georgian SSR	35	77	170	189	171
Azerbaijan SSR	18	44	144	191	172
Lithuanian SSR	--	20	155	180	205
Moldavian SSR	--	10	108	124	131
Latvian SSR	--	52	145	171	184
Kirghiz SSR	--	19	123	162	155
Tajik SSR	--	15	119	149	138
Armenian SSR	8	82	174	214	185
Turkmen SSR	--	22	103	131	125
Estonian SSR	--	45	165	161	171

Secondary Specialized Educational Institutions

USSR	9	50	158	180	170
RSFSR	9	53	178	199	185
Ukrainian SSR	12	47	142	168	158
Belorussian SSR	12	39	141	161	167
Uzbek SSR	3	37	99	134	147
Kazakh SSR	2	47	142	165	177
Georgian SSR	11	71	84	112	104
Azerbaijan SSR	18	52	120	135	125
Lithuanian SSR	--	22	193	206	191
Moldavian SSR	13	17	98	143	147
Latvian SSR	--	50	168	163	163
Kirghiz SSR	1	38	121	139	135
Tajik SSR	--	38	90	118	97
Armenian SSR	6	66	140	185	155
Turkmen SSR	8	57	115	129	116
Estonian SSR	--	20	213	175	159

7. Number of Scientists by Union Republics (at the end of the year; thousands of persons)

<u>Republics</u>	<u>1940</u>	<u>1965</u>	<u>1970</u>	<u>Total Number of Sci- entists</u>	<u>Those With an Academic Degree</u>		<u>Number of Scientists in Total Who Have an Academic Title</u>
					<u>Doctor of Science</u>	<u>Candi- date of Science</u>	
USSR	98.3	664.6	927.7	1,411.2	38.7	409.7	252.6
RSFSR	62.0	457.5	631.1	963.4	26.5	265.8	163.0
Ukrainian SSR	19.3	94.0	129.1	200.5	5.0	60.4	34.5
Belorussian SSR	2.2	14.7	21.9	39.4	0.8	11.2	7.5
Uzbek SSR	3.0	16.3	25.2	36.5	1.0	13.4	8.5
Kazakh SSR	1.7	18.2	26.8	38.5	0.7	12.0	7.1
Georgian SSR	3.5	14.2	20.2	25.9	1.3	9.3	6.5
Azerbaijan SSR	1.9	12.4	17.1	22.6	0.9	8.5	7.2
Lithuanian SSR	0.6	6.4	9.0	14.5	0.4	5.4	3.2
Moldavian SSR	0.2	3.8	5.7	9.0	0.3	3.6	1.8
Latvian SSR	1.1	6.0	8.9	12.9	0.3	4.3	2.9
Kirghiz SSR	0.3	3.7	5.9	8.6	0.2	2.7	1.4
Tajik SSR	0.4	3.5	5.1	7.7	0.2	2.6	1.8
Armenian SSR	1.1	7.8	12.8	19.9	0.7	5.8	4.3
Turkmen SSR	0.5	2.6	3.6	5.2	0.1	2.0	0.9
Estonian SSR	0.5	3.5	4.7	6.6	0.3	2.7	2.0

At the end of 1981 the USSR had 1.4 million scientists, for one-fourth of all the world's scientists.

8. Number of Graduate Students and Number Completing Graduate Studies

	<u>1940</u>	<u>1965</u>	<u>1970</u>	<u>1981</u>
Number of graduate students (at the end of the year)--total	16,863	90,294	99,427	97,860
Breakdown:				
Fulltime	14,425	51,109	55,024	42,011
Parttime	2,438	39,185	44,403	55,849
Graduate students completing their studies during the year--total	1,978	19,240	25,870	23,568
Breakdown:				
Fulltime	1,865	13,465	16,462	11,555
Parttime	113	5,775	9,408	12,013

9. Number of Graduate Students and Number Completing Graduate Study by Union Republics

Republics	Number of Graduate Students at the End of the Year				
	1965	1970	Total	1981	
				Fulltime	Parttime
USSR	90,294	99,427	97,860	42,011	55,849
RSFSR	61,272	67,619	67,329	30,226	37,103
Ukrainian SSR	11,689	13,513	13,275	5,271	8,004
Belorussian SSR	2,409	2,739	3,136	1,221	1,915
Uzbek SSR	2,972	3,197	3,388	1,267	2,121
Kazakh SSR	1,743	2,485	2,425	946	1,479
Georgian SSR	1,494	1,427	1,410	440	970
Azerbaijan SSR	2,734	1,991	1,589	495	1,094
Lithuanian SSR	930	1,041	885	348	537
Moldavian SSR	771	767	612	256	356
Latvian SSR	869	908	729	301	428
Kirghiz SSR	734	721	649	265	384
Tajik SSR	551	648	573	221	352
Armenian SSR	1,109	1,180	894	362	532
Turkmen SSR	448	632	514	219	295
Estonian SSR	569	559	452	173	279

Number Completing Graduate Study During the Year					
USSR	19,240	25,870	23,568	11,555	12,013
RSFSR	12,719	17,413	16,375	8,411	7,964
Ukrainian SSR	2,479	3,599	3,154	1,427	1,727
Belorussian SSR	516	661	768	334	434
Uzbek SSR	683	924	766	324	442
Kazakh SSR	397	561	559	239	320
Georgian SSR	332	402	331	139	192
Azerbaijan SSR	748	525	380	136	244
Lithuanian SSR	209	288	221	92	129
Moldavian SSR	127	199	147	61	86
Latvian SSR	183	249	181	82	99
Kirghiz SSR	161	221	155	70	85
Tajik SSR	127	169	126	60	66
Armenian SSR	263	357	189	91	98
Turkmen SSR	122	154	100	45	55
Estonian SSR	174	148	116	44	72

II. Increase in the Number of Workers and Employees in the Economy and Training of Skilled Personnel in the USSR

1. Growth Rates of the Average Annual Number of Workers and Employees in the Economy

Year	In Percentages of Respective Year										
	1922	1928	1940	1945	1950	1955	1960	1965	1970	1975	1980
1922	100										
1928	184	100									
1932	389	212									
1937	458	250									
1940	544	296	100								
1945	458	250	84	100							
1950	648	353	119	141	100						
1955	806	439	148	176	124	100					
1960	995	542	183	217	153	123	100				
1965	1,234	672	227	269	190	153	124	100			
1970	1,446	788	266	316	223	179	145	117	100		
1975	1,639	893	301	358	253	203	165	133	113	100	
1980	1,804	983	332	394	278	224	181	146	125	110	100
1981	1,828	996	336	399	282	227	184	148	126	112	101
1982											
(estimate)	1,849	1,008	340	404	285	229	186	150	128	113	102

2. Growth Rates of the Average Annual Number of Workers (including service and building maintenance personnel and guards) in the Economy

Year	In Percentages of Respective Year										
	1922	1928	1940	1945	1950	1955	1960	1965	1970	1975	1980
1922	100										
1928	189	100									
1940	518	274	100								
1945	447	237	86	100							
1950	630	334	122	141	100						
1955	804	426	155	180	128	100					
1960	1,003	531	194	225	159	125	100				
1965	1,223	648	236	274	194	152	122	100			
1970	1,406	745	272	315	223	175	140	115	100		
1975	1,568	830	303	351	249	195	156	128	112	100	
1980	1,710	906	330	383	271	213	170	140	122	109	100
1981	1,727	915	334	387	274	215	172	141	123	110	101
1982											
(estimate)	1,744	924	337	390	277	217	174	143	124	111	102

3. Training (graduation) of Skilled Workers in Vocational and Technical Educational Institutions*

<u>Indicator</u>	<u>Total Number of Workers Trained, in thousands</u>
1941	439
1960	741
1965	1,100
1970	1,638
1975	2,094
1980	2,430
1981--total	2,469
Those in daytime vocational and technical educational institutions alone	1,915
Further breakdown:	
In technical schools	719
In city vocational and technical schools	622
In rural vocational and technical schools	574
Number of the total number of persons trained in city and rural vocational and technical schools who have been trained in secondary vocational and technical schools	630
In evening (shift) vocational and technical educational institutions	554

A network of training centers and schools for vocational and technical education was set up in 1940 to furnish skilled personnel to industry, construction and transportation. They later became the vocational and technical educational institutions of the system of the USSR State Committee for Vocational and Technical Education. In all, the vocational and technical educational institutions of that system trained 47 million skilled workers from 1941 up through 1981.

* In this and the next table the figures are given for educational institutions of the system of the USSR State Committee for Vocational and Technical Education.

4. Training (graduation) of Skilled Workers in Vocational and Technical Educational Institutions by Union Republics (thousands of persons)

<u>Republics</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
USSR	1,100.4	1,638.2	2,094.3	2,430.5	2,468.9
RSFSR	699.6	994.6	1,230.1	1,399.3	1,393.6
Ukrainian SSR	182.4	270.7	341.5	382.7	386.6
Belorussian SSR	32.7	57.7	73.6	83.9	87.6
Uzbek SSR	21.1	41.8	74.7	115.2	138.7
Kazakh SSR	88.7	117.8	160.9	175.7	183.3
Georgian SSR	8.9	20.6	25.0	34.1	35.6

4 (continued)

<u>Republics</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Azerbaijan SSR	9.4	29.0	42.9	56.4	58.2
Lithuanian SSR	8.0	17.1	20.8	24.7	23.1
Moldavian SSR	9.7	19.1	27.7	29.1	29.2
Latvian SSR	9.4	14.2	19.3	20.7	20.0
Kirghiz SSR	7.8	16.9	24.9	30.8	32.8
Tajik SSR	5.9	12.2	13.9	17.9	19.1
Armenian SSR	8.5	15.0	21.7	33.2	34.7
Turkmen SSR	4.8	6.8	10.7	18.9	18.6
Estonian SSR	3.5	4.7	6.6	7.9	7.8

5. Training and Improvement of Qualifications of Workers and Employees in Enterprises, Institutions and Organizations* (millions of persons)

<u>Indicator</u>	<u>1940</u>	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Total number of workers and employees who have learned new occupations and specialties	2.4	3.7	4.9	6.6	7.6	7.9	7.2
Workers alone	2.1	3.5	4.6	6.4	7.4	7.8	7.0
Total number of workers and employees who have gone through training to improve their qualifications	1.2	6.1	8.3	10.5	21.9	30.8	34.1
Workers alone	1.0	4.6	6.1	7.4	14.7	21.3	24.4

* The figures represent a revision of those published previously.

6. Training and Improvement of Qualifications of Personnel on Kolkhozes* (thousands of persons)

<u>Indicator</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1981</u>
Number who have learned new occupations	263	247	377	434	394
Number who have gone through training to improve their qualifications	700	1,414	2,202	2,791	2,809

* The figures represent a revision of those published previously.

7. Training and Improvement of Qualifications of Workers and Employees in Enterprises, Institutions and Organizations by Union Republics in 1981 (thousands of persons)

<u>Republics</u>	<u>Total Number of Workers and Employees Who Have Learned New Occupations and Specialties</u>	<u>Total Number of Workers and Employees Who Have Gone Through Training To Improve Their Qualifications</u>
USSR	7,160	34,140
RSFSR	4,170	20,186
Ukrainian SSR	1,312	6,491
Belorussian SSR	256	1,320
Uzbek SSR	267	861
Kazakh SSR	474	1,893
Georgian SSR	74	275
Azerbaijan SSR	81	452
Lithuanian SSR	78	368
Moldavian SSR	102	532
Latvian SSR	69	349
Kirghiz SSR	74	357
Tajik SSR	47	246
Armenian SSR	82	376
Turkmen SSR	33	156
Estonian SSR	41	278

8. Number of Specialists With Higher and Secondary Specialized Education Employed in the Economy* (thousands of persons)

<u>Year</u>	<u>Total</u>	<u>Breakdown</u>	
		<u>With Higher Education</u>	<u>With Secondary Specialized Education</u>
1928	521	233	288
1941	2,401	909	1,492
1960	8,784	3,545	5,239
1965	12,066	4,891	7,175
1970	16,841	6,853	9,988
1975	22,796	9,477	13,319
1980	28,612	12,073	16,539
1981	29,800	12,600	17,200

* The figures on the number of specialists were derived from the materials of one-time surveys: for 1941 on 1 January, for 1960 on 1 December, for the 1965-1980 period as of mid-November, and for 1981 at the end of the year (estimate).

9. Number of Women Specialists With Higher and Secondary Specialized Education Employed in the Economy* (thousands of persons)

Year	Total Number of Women Specialists	Breakdown		Percentage of Women in Total Number of Specialists With Higher and Secondary Specialized Education
		With Higher Education	With Secondary Specialized Education	
1928	151	65	86	29
1941	864	312	552	36
1960	5,189	1,865	3,324	59
1965	6,941	2,518	4,423	58
1970	9,900	3,568	6,332	59
1975	13,411	4,962	8,449	59
1980	16,956	6,410	10,546	59
1981	17,650	6,700	10,950	59

* The figures on the number of specialists were derived from the materials of one-time surveys: for 1941 on 1 January, for 1960 on 1 December, for the 1965-1980 period as of mid-November, and for 1981 at the end of the year (estimate).

III. Payments and Benefits From Social Consumption Funds and Expenditures of the State for Public Education, Social Security and Social Insurance in the USSR

1. Payments and Benefits Obtained by the Public From Social Consumption Funds

Indicator	1940	1965	1970	1975	1980	1981
Payments and benefits--total, billions of rubles	4.6	41.9	63.9	90.1	117.0	122.0
Breakdown:						
Education (free education, cultural and educational work)	2.0	13.2	18.7	25.1	31.6	32.6
Scholarships alone	0.2	0.9	1.3	2.2	2.5	2.6
Health care and physical education (free medical care, service in sanatoriums and health resorts, physical education, etc.)	1.0	6.9	10.0	12.9	17.2	17.9
Social security and social insurance	0.9	14.4	22.8	34.6	45.6	48.1
Breakdown:						
Pensions	0.3	10.6	16.2	24.4	33.3	35.4
Benefits	0.5	3.5	6.1	9.2	11.0	11.3
Expenditures of the state to maintain the housing stock (the portion not covered by the low rent)	0.1	2.3	3.4	4.9	6.9	7.3
Per capita benefits, in rubles	24.0	182.0	263.0	354.0	441.0	456.0

Free education and improvement of qualifications, free medical care, benefits, pensions, student scholarships, payment of annual vacations, free and reduced-rate vouchers to travel to sanatoriums and rest homes, the funding of children in preschool institutions and a number of other benefits and payments are covered for the population out of social consumption funds. In 1981 money payments represented more than 50 percent of the sum total of payments and benefits.

Expenditures of the state per pupil on an annual basis were as follows: about 200 rubles in general public schools, more than 700 rubles in secondary specialized educational institutions, and about 1,100 rubles in higher educational institutions. More than 580 rubles were spent for each child in day nurseries per year, about 500 rubles per child in nursery schools; moreover, 80 percent of these expenditures are paid by the state. The state allocates more than 10 rubles per sick person per day.

2. Expenditures for Public Education and the Upbringing of Children (millions of rubles)

<u>Indicator</u>	<u>1975</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Expenditures for public education and the upbringing of children--total	26,705	30,912	31,733	32,477
Current expenditures alone	22,374	25,766	26,805	27,369
Further breakdown:				
Preschool upbringing (day nurseries, nursery schools, combination day nurseries and nursery schools)	4,013	5,069	5,374	5,547
General education:				
Daytime general public schools	8,906	9,248	9,471	9,668
General schools for young workers (evening and correspondence)	453	486	491	489
Vocational and technical education and training of personnel with secondary specialized education (vocational and technical training centers and schools, tekhnikums)	3,788	4,485	4,598	4,647
Training of personnel with higher education (higher educational institutions)	3,100	3,697	3,883	3,888
Other types of training (courses and other measures to improve the qualifications of personnel, work with children outside of school, etc.)	2,114	2,781	2,988	3,130
Capital investments and major repairs	4,331	5,146	4,928	5,108
In addition, the pay of parents to keep children in preschool institutions and boarding schools	1,042	1,244	1,293	1,310

3. Expenditures for Social Security and Social Insurance (millions of rubles)

<u>Indicator</u>	<u>1975</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Expenditures for social security and social insurance--total	34,634	42,350	45,628	48,144
Pensions alone	24,441	30,601	33,323	35,447
Benefits alone	9,228	10,433	10,956	11,297
Further breakdown:				
For sick leave	5,240	6,262	6,707	6,928
For pregnancy and childbirth and articles to care for and feed the infant	1,369	1,567	1,628	1,726
For unmarried mothers and mothers with many children	389	325	311	305
For children of indigent families	1,219	1,143	1,082	1,038
Other benefits (lump-sum aid, burial benefits, etc.)	1,011	1,136	1,228	1,300
Other types of social security (support of homes for the elderly and disabled persons, expenditures for prosthetic appliances, etc.)	965	1,316	1,349	1,400

Expenditures for public education, social security and social insurance are made from the resources of the state budget and those of state, cooperative, trade union and other public enterprises and organizations and kolkhozes.

Resources for these purposes are allocated by the state mainly from the state budget. For instance, in 1981 funds from the state budget represented more than 90 percent of all expenditures for education and social security.

Expenditures to support children in preschool institutions and boarding schools are made in a negligible proportion from the resources of parents. The charge to parents of keeping one child in children's preschool institutions is only about 20 percent, and in the case of boarding schools 7 percent of all the expenditures to support the child during the year.

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